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ORIGINAL

# Perceptions about the use of Artificial Intelligence in external internships in higher education

## Percepciones docentes sobre el uso de la Inteligencia Artificial General en las prácticas externas en educación superior

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## ABSTRACT

Generative artificial intelligence (GAI) is generating significant interest in higher education due to its ability to personalize learning and automate academic and administrative tasks. It also fosters new forms of interaction between faculty and students. Given the limited literature on its application in practicum supervision and mentoring, this study aims to analyze university professors' perceptions of the use of GAI in this educational context. An exploratory and descriptive study with mixed-methods design was conducted with the participation of thirty-one professors and researchers from fifteen universities in seven countries. Within the framework of the RedTICPraxis, four specialists were invited to share their knowledge and experiences through video presentations, which subsequently generated an international debate. The discussions were analyzed using the Coannotation tool, yielding 132 annotations classified using a structured social tagging system based on SWOT categories (strengths, weaknesses, opportunities, and threats) and the additional "uses" tag. The findings highlighted strengths and opportunities, such as IAG's ability to personalize learning, support assessment, and automate practicum-related tasks. In contrast, weaknesses related to technological dependence and threats linked to data privacy and algorithmic biases were observed. In conclusion, participants perceived IAG in the practicum with an ambivalent stance, combining enthusiasm and caution, underscoring the need for digital literacy and ethical use to maximize the benefits and mitigate the risks of its implementation in higher education.

**Keywords:** Perceptions; IAG; Higher Education; Practicum; DAFO.

## RESUMEN

La inteligencia artificial generativa (IAG) despierta gran interés en la educación superior por su capacidad de personalizar el aprendizaje, automatizar tareas académicas y administrativas; también favorece nuevas formas de interacción entre docentes y estudiantes. Por la limitada literatura sobre su aplicación en la supervisión y tutoría del prácticum, este estudio se propone analizar las percepciones de profesores universitarios sobe el uso de la IAG en este contexto formativo. Se realizó una investigación exploratoria y descriptiva con un diseño de métodos mixtos, en la que participaron 31 docentes e investigadores de 15 universidades de siete países. En el marco de la RedTICPraxis, cuatro especialistas fueron convocados para

compartir sus conocimientos y experiencias mediante presentaciones en video, lo que generó posteriormente un debate internacional. Las discusiones fueron examinadas con la herramienta Coannotation, obteniéndose 132 anotaciones clasificadas mediante un sistema de etiquetado social estructurado basado en categorías DAFO (debilidades, amenazas, fortalezas y oportunidades) y la etiqueta adicional de "usos". Los hallazgos destacaron fortalezas y oportunidades como la capacidad de la IAG para personalizar los aprendizajes, apoyar la evaluación y automatizar tareas vinculadas al prácticum. En contraste, se observaron debilidades relacionadas con la dependencia tecnológica y amenazas vinculadas con la privacidad de los datos y los sesgos algorítmicos. En conclusión, los participantes percibieron la IAG en el prácticum con una postura ambivalente que combina entusiasmo y cautela, subrayando la necesidad de alfabetización digital y de un uso ético que permita maximizar los beneficios y mitigar los riesgos de su implementación en la educación superior.

**Palabras clave:** Percepciones; IAG; Educación Superior; Prácticum; DAFO.

## INTRODUCTION

The incorporation of general artificial intelligence (GAI) is an interdisciplinary field of computer science that focuses on the creation of computer systems capable of performing different activities that generally require human intelligence, such as reasoning, problem solving, and decision making, which has transformed various sectors in education and has been widely studied since 1951, when a program was created to play chess. It was the British scientist Alan Turing, considered one of the fathers of computing and a pioneer of modern computer science, who, while exploring the intelligence of machines, raised the question of whether "a machine could think."[1] This marked the beginning of several studies on the impact of AI on education and how it could change the teaching-learning process.

From that moment on, various conjectures were made about the educational and social impact of AI. Several questions even arose, such as: What exactly is AI? To which some have attempted to respond: "AI is a field that merges computer science and robust data sets for the purpose of helping to solve problems."[2] In general, previous research agrees and attempts to demonstrate, among other things, that AI increases learning efficiency, provides real-time interaction, and adapts educational content to the individual needs of students.

A UNESCO report estimates that more than 60 % of educational institutions in developed countries are using technologies and rely on AI to improve teaching and learning processes. In Latin America, the adoption of AI in the education sector is still in its infancy, with less than 30 % of universities integrating these tools into their classrooms.[3]

The core of AI, as Mancilla[2] states, is algorithms linked to human intelligence based on the capacity that every person has to reason, learn, manipulate, plan, and develop their creativity.[4] With the use of AI, advanced training modules and specific specialized platforms and assessment tools necessary for various tutoring and external practice support systems are developed or elaborated, highlighting its importance in the creation of high-level training environments with the necessary characteristics and models to adapt them to academic needs.

Among the benefits that technology offers to academic teaching provided by teachers is a large number of available resources or tools designed to improve methods or techniques and make learning processes more attractive to undergraduate students. It also allows teachers to take advantage of the benefits offered by AI, as it favors the possibilities of achieving personalized teaching according to the needs of the students. This allows teachers to modify and readjust the activities, objectives, and competencies established in specific learning units, and can also generate an approach in line with the educational requirements of today's digital society.

According to Mera, the implementation of new tools and emerging technologies provides opportunities and benefits for improving learning experiences and the implementation of practicums.[4] This allows for improvements in educational content according to the specific needs of students. Technological advances continue to pose a challenge for implementing artificial intelligence at educational levels. The issue of data privacy is a crucial one that raises significant ethical considerations for the protection of student data. The integration of AI in education is an issue that benefits teachers, researchers, and students because of the collaboration it allows for in adapting teaching in a specific way.

However, its inclusion also poses challenges, which must be addressed with appropriate strategies aimed at maximizing benefits and minimizing risks for correct application in the educational field. García-Peña, Mora-Marcillo, and Ávila-Ramírez explain how AI has been adopted in crucial sectors such as transportation, healthcare, recreation, finance, entertainment, and robotics, which may also come to depend on this new

branch of knowledge.[5] Based on a bibliographic design, these authors propose a methodology for using AI in the education sector, especially in the categories of "supervision processes, university admission and retention, early detection of behavioral problems, and methodological strategies in the learning of people with disabilities."

The impact that AI has not only on education but also on the transformation, management, and administrative operations of universities must be taken into account. Relevant studies indicate that processes for managing resources, making decisions, and personalizing services have been optimized to be more efficient and adaptable to institutional requirements.

Another aspect to consider is the challenges involved in adhering to both responsible training and ethical guidelines, which are necessary to maximize the potential application of AI. In this context, as Valle suggests, integrating AI into university administrative practices offers new opportunities to optimize quality and efficiency in management.[6] In turn, Şahín offers some solutions to the potential problems arising from a lack of ethics.[7]

The impact and perceptions of AIAG affect teachers, particularly those who must consider its influence on the professional practices of university graduates. This impact can be seen in:

After conducting and applying a survey of 1 327 university professors and administrators in the US, it is considered that, in the next five years, the majority expect significant changes in learning processes resulting from the use of AI. The authors of this work note that: "Ultimately, AI has the potential to be both advantageous and disadvantageous for teaching and learning, and the benefits and challenges of its use vary depending on the context."[8]

The results of another related study also reveal that "teachers value the potential of AI to optimize teaching and personalize learning, but express concerns about the loss of critical skills and the impact on the teacher-student relationship."[9]

Quoted by José Luis Soto Ortiz in his article "The impact of AI on teaching practice," Nigel Francis, Sue Jones, and David Smith warn of a "double-edged sword" of AI: On the one hand, it improves the automation and efficiency of "tasks," but on the other, it threatens integrity and exacerbates digital inequalities.[10]

Later, when considering the importance of establishing the ethical protocols necessary to regulate new interactions, this author quotes Ogunleye et al., who state: "Teachers need AI literacy and institutional models that promote critical thinking and interdisciplinary collaboration."[11] Other authors such as Veletsianos, Houlden, and Johnson explored how the relationship between students and AI is perceived; they found that it can be seen as an object or as a pedagogical subject.[12]

Repetitive activities, such as those automated, make productivity more efficient, saving professionals time for strategic and creative tasks. Additionally, AI can minimize human error in specific or routine tasks by enhancing consistency and accuracy.[13]

The digital transformation of skills into new competencies that graduates develop and machine learning, in line with labor market demands, make it vital for professionals to engage in continuous technological training to stay up to date and ensure their competitiveness in a constantly evolving digital economy.[14]

The benefits of using IAG in external professional internships or practicums for higher education students offer an excellent opportunity to transform teaching by providing personalized solutions according to the needs of each student, which extends far beyond the opportunity to apply acquired knowledge in a practical environment. It offers them various options for acquiring essential professional skills, improving their real-time decision-making, and increasing their self-confidence in real work environments. However, it also presents several ethical challenges, information privacy issues, and dependence on the use of technologies such as ChatGPT.

Training students in digital skills is essential when they reach the practicum stage,[15] because it will help them identify areas for improvement in their learning experiences and assist the educational context. A personalized approach to learning is essential to integrate skills into real-life scenarios and obtain valuable information for professional development. Feedback from tutors is key to this process, as it complements and enriches the learning and reflection process during the practicum, helping to consolidate the theoretical and practical knowledge acquired during the academic training process.

Advances in IAG's leading technological tools offer various applications for the university environment, which have allowed us to evolve the algorithms designed for predictive models and improve deep learning, applied in higher education to enhance academic performance. In addition to investing in training and professional development, which helps us improve skills, it allows us to develop strategies and monitor student results.[16]

Artificial intelligence allows for innovation in the different areas of improvement necessary for the teaching-learning process and in the skills of professionals in the university environment. In addition, the IAG provides benefits for the continuing education of teaching and administrative staff when new emerging tools are used correctly and ethically. According to Valle, it is essential to adopt a balanced approach to the benefits of technologies that minimizes the potential negative impacts and biases that may arise during the

process.[6]

Currently, education has already changed both the way we teach and the way we learn, through platforms that facilitate adaptive learning and personalized tutoring. For example, with the "adaptive learning method, the full potential of new technologies is harnessed and nourished by innovative and interesting concepts such as artificial intelligence and big data."[17]

When referring to the new skills that are necessary for individuals who are part of the knowledge society, Siemens, as cited in García-Peña; Mora-Marcillo, and Ávila-Ramírez, specifies, among others, these new skills: "Anchoring, filtering information, connecting as human beings, jointly evaluating the value of knowledge, constant critical thinking, recognition of patterns and trends, resilience and adaptation skills."[5]

Teachers and students must be ethical and responsible because they must be aware of the implications of using AI. According to Guerra, UNESCO proposes several ethical principles in education, including: "Transparency and accountability, safety and security, sustainability and proportionality, governance, a human-centered approach, privacy, and inclusivity."[18]

UNESCO also recommends challenges for the sustainable development of AI in education.

"Develop comprehensive public policies with inclusion and equity. Prepare teachers for education with AI. Train AI in education. Develop inclusive, high-quality data systems. Ensure that research in AIDE is meaningful. Ensure ethics and transparency in the collection, use, and dissemination of data."[18]

AI is creating new job opportunities, other roles, and professions, such as machine learning engineers, data scientists, and various specialties, namely: "AI Trainer/Curator, Robotics Engineer, AI Legal Specialist, AI Advisor, AI Security Specialist, Conversational AI Developer, AI Business Analyst, and AI Content Creator."[19]

In addition, these professional opportunities encourage the adoption of new approaches, rapid change, and the ability to use high-quality technologies appropriately. All of this not only supports the growth of technical skills but also allows students to become part of professional networks.

Luckin et al. highlight that IAG, in addition to optimizing classroom learning, also offers real-time feedback in practical contexts, as seen in professional internships, which improves student training.[20]

In this case, the use of IAG during the practicum allows students to acquire professional skills, improve decision-making, and increase their confidence in real work environments. According to Ríos Hernández et al., this experience encourages the use of advanced technologies and connection with professional networks, thus facilitating professional technical growth.[21]

Practicums in university education have a long history,[22,23] especially in the fields of health, education, etc.. With some more recent regulations, at least in Spain, they have become more widespread in all other areas and university degrees.

Reviews of the impact of IAG on university education provide generic results [24,25] and do not yet specifically address external internships. However, it is possible to deduce a logical inference from the general results; it would be interesting to explore the possibilities that AI can offer, such as the results of studies on this topic.

As there is not much specialized literature on AI or IAG in practicums and the subject is of vital importance, it is logical that teachers are interested in learning about its possibilities, requirements, and even the dangers it may pose. In this sense, the purpose of this study is to bridge this gap on the impact of AI on the tutoring and supervision of practicums and external internships.

In accordance with the above, this paper presents the comments of 31 teacher-researchers from seven countries who gave their informed consent, guaranteeing their voluntary participation in the study. They ensured that the information provided was confidential and anonymous, using random identifiers to protect the identity of the participants.

In addition, the data was stored securely in accordance with current data protection regulations. Throughout the process, the ethical guidelines established by UNESCO regarding the use of AI in the education sector were followed.[26]

Then, analyze and evaluate the videos presented by AI specialists, whose perceptions were shared on the Coannotation platform, with the aim of better understanding the use and teaching of IAG tools in higher education.

**General Objective**

To understand perceptions of the use of AI technology in the different dimensions of practicums or external internships in higher education. When organizing the comments of the participating teachers, the labels considered for the analysis were taken into account, as the participants were able to specify the use of technological tools and the application of IAG in higher education, which was used to identify patterns that could provide a comprehensive and critical view of their perceptions or their own experiences.

**Research Questions**

What is the perception of teachers regarding the impact of IAG on education?
How do they perceive the influence of IAG on the practicum from the SWOT model?
What are teachers' perceptions of good practices and uses of IAG in practicums?

## METHOD

The research adopts a mixed approach with a greater qualitative weight, exploratory and descriptive in nature, focused on understanding the perceptions of the teachers involved regarding the use of generative artificial intelligence (GAI) in practicums and/or external professional internships for university students. This approach is justified and integrates data analysis techniques and the need to capture both the depth of the participants' comments and the frequency and connectivity patterns of their interventions on the categories emerging from the annotations,[27] which allows for strengthening and better interpreting the different considerations of the data obtained.

Consequently, the different emerging categories are shown, based on 132 annotations generated by 31 teachers and researchers from 15 universities in Argentina, Brazil, El Salvador, Peru, Portugal, Mexico, and Spain. All participants have experience in the practicum process or the implications of external professional practices for students in different educational programs. The teachers participated through the collaborative platform Coannotation.com. The analytical exercise was developed based on comments made in virtual seminars organized by RedTICPraxis, where audiovisual materials on IAG and its impact on education were discussed.

The minimum units of analysis were textual annotations, classified according to the use of tags under two modalities: one free (free folksonomy) and the other structured (closed folksonomy), the latter consisting of the following categories: Weaknesses, Threats, Strengths, and Opportunities (SWOT) plus the tag "Uses."[28,29,30,31,32,33]

As Ruíz points out, content analysis aims to understand both the text and the meaning of discourse within specific contexts, which informs the qualitative approach. In this case, the triangulation of methods enriched the interpretation of the data, ensuring methodological rigor and the possibility of replicating this research experience in other contexts. For this reason, the techniques used in text analysis are approached qualitatively.

The categorization of the texts allowed the information to be classified for further analysis, based on the content analysis model,[34] which facilitated the identification of relevant patterns and trends in teachers' perceptions.

After exporting the data, it was stored in an information management system on the Coannotation.com platform, where, to ensure security and confidentiality in accordance with applicable data protection regulations, it was used only by researchers with access.

The information was processed using tools such as Q-categories and Excel for further analysis,[35] which allowed for a qualitative study of the emerging categories and also quantitative analyses to identify patterns graphically, as well as the relationships between the connectivity of the tags used. The visualization of associations between categories and the frequency of their use, to differentiate the perceptions of participants (e.g., teachers versus researchers, or according to experience in external practices).

Using the tools incorporated into the platform itself (Coannotation), it was possible to observe the annotations that teachers incorporated into different parts of the videos referring to IAG, thus interpretations of the categories (tags) in the qualitative analysis could be refined. Through the compilation of specific data and statistical results, the perceptions that teachers have about the use of IAG in external placements in higher education are described and, with the respective adherence to quantitative methodology, shown.

The RedTICPraxis community: Description of the context and participants, from the Association for the Development of Practicum and External Practices: Practicum Network (REPPE).(Appendix 1 and 2) This network promotes debate and collaboration among teachers and researchers interested in good external professional practices, to share research results.

**Instruments**

At the beginning of the two years, RedTICPraxis invited four AI experts from three different universities to give a 30-minute presentation on their knowledge and the possible applications of AI for supervising and tutoring the practicum; the four labels of the SWOT model (Strengths, Weaknesses, Opportunities, and Threats) were used from the outset. After this presentation, all members of RedTICPraxis participated in a debate and discussion that was recorded on video and shared on YouTube for private analysis.

To do this, the free video annotation tool Coannotation.com was used. This tool allows videos that are already hosted on the YouTube platform to be inserted and analyzed within the tool through multimedia annotations on specific fragments of the video.

For this study, a space was opened on the Coannotation.com video annotation platform for a limited time, and all members of the teaching community were invited to make their annotations or individual comments on a timeline. All participants gave their informed consent, guaranteeing their voluntary participation in the study.

They ensured that the data provided was confidential and anonymous.[36,37] In addition, the use and form of use of one or more of the four previously defined SWOT labels were shown in each annotation, such as "Uses" referring to the possible practices and applications of IAG in the practicum (closed folksonomy), as well as others that were considered (free folksonomy).

The meanings of closed tags were: Weaknesses, problems that have not yet been resolved; Threats, factors perceived as dangerous; Strengths, benefits identified for incorporation; Opportunities, factors favorable for integration; and Uses, good practices and models that can be replicated in any context. Throughout the process, the ethical guidelines established by UNESCO for the responsible use of IAG in education were followed.

## RESULTS

Based on the qualitative analysis, the number of annotations generated once the videos were recorded and analyzed totaled n=132, all of which used at least one of the predefined or closed tags (SWOT and "Uses").

Figure 1 shows a word cloud of the most frequently used free and closed tags in all annotations. It can be seen that the words strengths, uses, opportunities, training, and recommendations are the most frequent, revealing the weight that participants attribute to these dimensions. These are followed by others such as threats, teachers, and students. This finding coincides with that of García,[38] who highlights that AI is perceived as a resource for strengthening the personalization of learning and assessment.

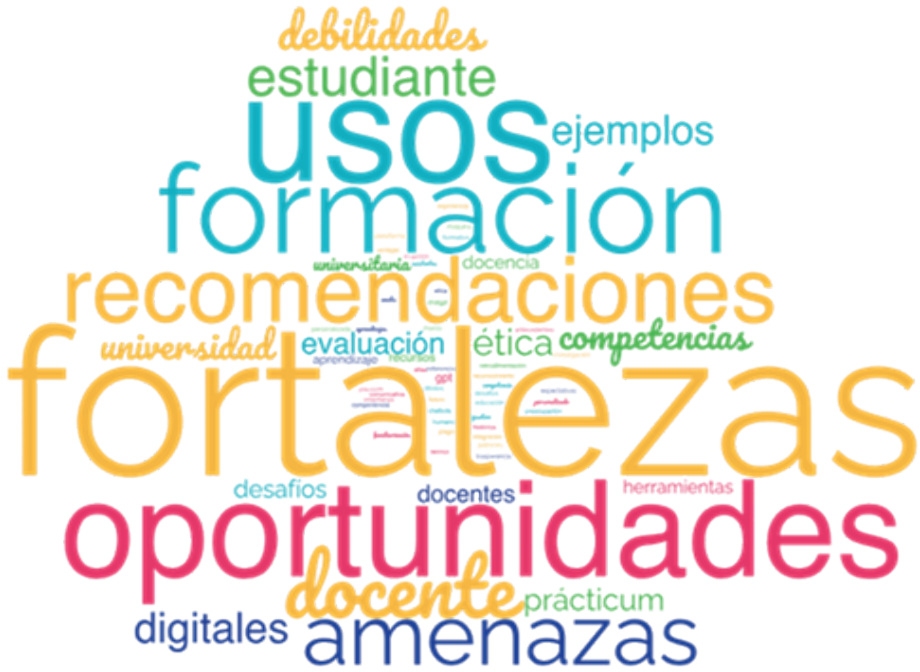


**Figure 1**. Most frequently used free (open folksonomy) and predefined (closed folksonomy) tags
**Source**: Generated with nubedepalabras.com

Within the set of annotations with SWOT tags, the following are observed, in descending order of frequency: Strengths (35), Opportunities (22), Threats (12), and Weaknesses (10), in addition to 37 related to the tag Uses.

Figure 2 graphically shows the connectivity of these categories, where Uses, Strengths, and Opportunities appear as the central nodes, connected through contextual relationships based on their proximity within the list, using a force distribution algorithm that organizes the most interrelated words toward the center, while those with fewer connections are located on the periphery. The tags highlighted with a larger blue circle represent the most recurrent ones, such as "Uses," "Strengths," "Opportunities," and "Threats," highlighting their importance in the textual content analysis.


**Figure 2.** Relationship between all free and closed tags
**Source**: Generated with the support of OpenAI's ChatGPT.

All annotations had at least one label, and most were accompanied by multiple annotations. This shows the complexity of the situation and the certainty of the participants. Offering the possibility of free labels led to more uses, which generated greater content production in multiple closed annotations (1 274 words), as was the case in other studies comparing this double folksonomy.[27]

The following are the results of the content analysis of the annotations in relation to the tags used to understand teachers' perceptions of them:

*A. Analysis of annotations containing SWOT tags*

Before examining the results for each of the tags, figure 3 illustrates the key aspects of artificial intelligence (AI) use in education, highlighting the most frequently used words in annotations containing SWOT tags. It also highlights threats such as prohibition, privacy, and bias, which reflect ethical and security concerns; opportunities such as automation or personalization for the improvement of teaching and learning processes offered by AAI; strengths such as evaluation for the support and improvement of the skills developed in the practicum; and finally, weaknesses such as dependence, which are caused by the excessive use of tools.


**Figure 3**. Most frequent terms used in SWOT tag annotations
**Source**: Generated with nubedepalabras.com

Strengths

In their notes, higher education teachers state that IAG can help enrich learning, which benefits the tutoring system during the practicum, allowing for the more specific needs of students to be met. This finding is consistent with García's[38] research, which highlights that IAG can improve teaching methods and personalize learning. Consequently, teachers need to enhance their critical thinking and creativity skills, utilizing applications such as ChatGPT and Copilot to facilitate the assessment process.

Opportunities

Advantages such as the automation of repetitive tasks and personalizing learning were identified. These benefits are supported by studies showing how the use of AI can help transform the practices and strategies of teachers in the education sector in the practicum by tutors or supervisors, thus representing several opportunities to promote more adaptive and efficient teaching, integrating new methodologies that encourage collaboration and student participation.

Threats

Rentería García points out that teachers recognize the usefulness of AI. Still, the annotations also highlight that it may pose significant risks, which is why institutions are concerned about the use of AI, data privacy, and algorithmic biases being deemed inappropriate. On the other hand, they also reveal the opportunities and progressive growth of knowledge in higher education, as well as the potential to improve teaching and enhance meaningful learning.[40]

Weaknesses

One of the main weaknesses of using IAG in higher education lies in technological dependence, which limits the development of students' personal critical thinking skills. As Cinta et al. point out, this represents a significant obstacle to integrating AI into educational processes. Investment is required to improve training and upgrade technological infrastructure when necessary to enhance university environments.[41]

*B. Analysis of annotations that used the tag "uses of AI in the practicum."*

Teachers highlight several uses of artificial intelligence in the practicum in 37 annotations. We can emphasize the importance of effectively utilizing various AI tools to generate innovative forms of learning and design intervention units tailored to different educational contexts. AI is used in diaries and practice reports because it is generally beneficial for teachers in the classroom. Figure 4 illustrates the keywords related to "uses of AI in the educational context and good practices." Terms such as "contexts," "learning," "tools," "practices," and "models" stand out, reflecting how artificial intelligence is implemented in various scenarios in the educational field.

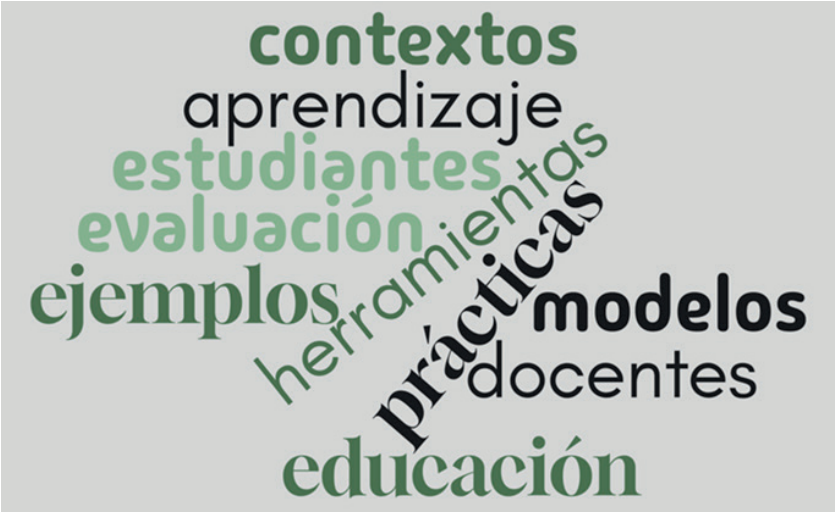


**Figure 4**. Most frequently used terms in annotations tagged with "uses of AAI."
**Source**: Generated with nubedepalabras.com

The annotations of the "uses of AI" tag show the importance of properly integrating artificial intelligence into different contexts and the need to understand how it can be adapted to teaching and learning processes. Teachers recommend including AI responsibly in assessment tasks, showing examples to share, and then explaining how it can be implemented responsibly.

In addition, the annotations refer to specific applications of artificial intelligence, such as Copilot, ChatGPT, Consensus, and Gemini, and provide examples of their use, including facilitating the creation of learning situations or platforms that integrate teaching tools. Teachers also emphasize the importance and necessity of an ethical and responsible approach, and appreciate that students have a favorable attitude toward artificial intelligence for assessment purposes. In short, teachers perceive that it presents opportunities for the quality of learning and teaching in the practicum.

*C. Analysis of annotations that used free tags (free folksonomy).*

Figure 5 shows the free tags that have been incorporated by teachers in the 22 annotations related to AIG in education and that were not previously defined in the Coannotation platform. Teachers added tags such as 'recommendations', 'assessment', 'learning', and 'tools', which seem to be linked to an approach based on analysis, feedback, and personalization of the educational process using artificial intelligence. Topics of interest, such as 'ethics' and 'teaching', are also observed in the tags.

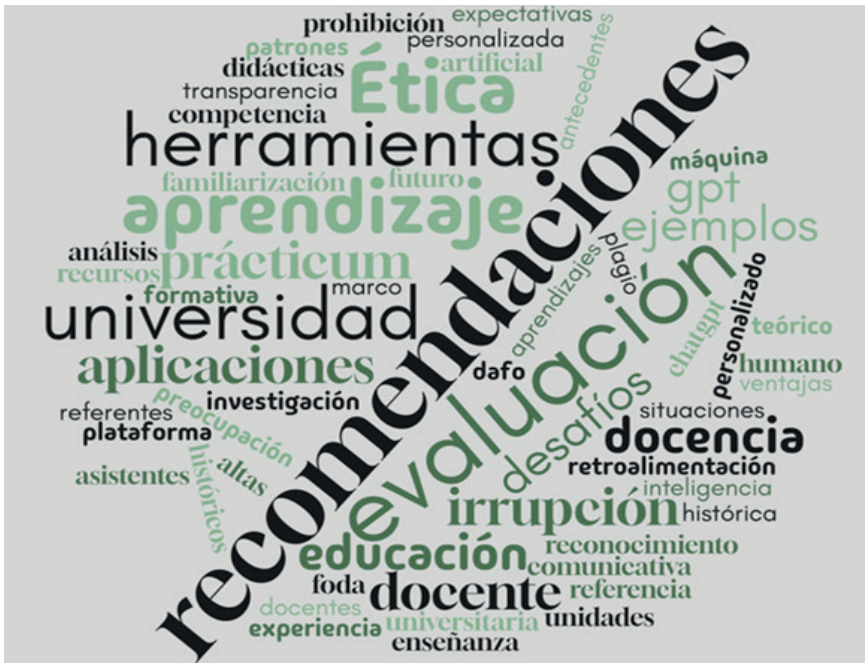


**Figure 5**. Free tags
**Source**: Generated with nubedepalabras.com

Teachers in the free-text annotations emphasize the arrival of AI in education, highlighting both new opportunities and restrictions due to its inappropriate use by students during practicums, which reflects the importance of responsible education. The annotations also highlight that, since its emergence in 2021, AI has helped in teaching and learning processes, but at the same time has encountered challenges in data protection and the emergence of computer biases. Teachers also mention the need for continuous training to adapt to new tools and make better use of their benefits.

*D. Analysis of annotations in relation to those with single or multiple labels*

When comparing the number of words in single closed multiple labeling versus closed labeling, there are more words and content in closed multiple labeling, followed closely by free labeling. The number of words used in closed multiple labeling is more distinct than those in free multiple labeling.

1 274 words in multiple closed tagging
468 words in closed labeling
417 words in free labeling
209 words in multiple free tagging

With the categories defined, the relationships and patterns between the different topics were analyzed. General trends were identified, and teachers' perceptions of the use of technological tools were explored. This interpretation provided a comprehensive view of teachers' attitudes and experiences, highlighting critical issues and areas for improvement.

## CONCLUSIONS

Teachers participating in RedTICPraxis perceive the IAG implemented in the practicum as a combination of enthusiasm and caution regarding the use of AI, with a balanced view in higher education and especially in external practices. In response to the first research question on teachers' perceptions of IAG according to the SWOT model, the benefits highlighted include the personalization of learning to optimize processes and efficiency in assessment, as well as opportunities to innovate in teaching and automate administrative tasks.

The importance of addressing threats and areas for improvement related to data privacy is highlighted. This shows the priority of digital literacy and education for the ethical and responsible use of new technologies,[42] which is why it is essential to raise awareness among students and teachers.[43,44,45]

The findings show the balanced and rigorous use of new AIG tools to maximize benefits, which highlights the need to train students and teachers to question the information provided by AIG and, through critical analysis, to assess the relevance of the information and promote the responsible use of AIG.

The collection and use of personal data by students during external internships and provided to the IAG generates some security threats and risks.[18] The functioning of IAG algorithms can be inherently biased and unequal, and this has begun to pose a challenge for the education system.[6] There is fear and uncertainty in the absence of clear regulations for the development of the technology used in IAG, regarding its responsible use with respect to ethics.

AI offers opportunities to support the integration of active methodologies into teaching and learning processes,[46] such as project-based learning,[47] collaborative work, evaluation, and the continuous optimization of educational programs. It also prepares students for their future careers by providing them with the digital skills and data analysis capabilities needed today to enter the workforce.

The strengths of AI in education encourage the personalization of learning, adapting the content and pace of learning units to the particular characteristics of each student.[17] It improves efficiency by automating repetitive tasks. It also allows students access by offering educational resources and support to develop different skills for analyzing performance.

The use of IAG in education can have weaknesses. It is therefore essential to recognize that excessive use could lead to technological dependence and discourage learning and critical thinking among students. Additionally, there may be resistance to change and a reluctance to adopt new methodologies. There may also be limitations derived from infrastructure and the quality of information.

IAG can be used for different purposes in education, such as adaptive learning,[17] where content is tailored to students' needs through the implementation of automated tutoring systems (chatbots, virtual assistants) that answer frequently asked questions or provide basic tutoring for students. Learning analytics can also be an application of AI, through which data can be retrieved and analyzed to identify patterns in student performance and inform improvements to teaching strategies. IAG also allows for the automation of assessments and provides immediate feedback to students during the practicum.

The results obtained show that teachers have an ambivalent perception of AI used in professional practice: they recognize its strengths, such as the personalization of learning and automation that can be used for different tasks, as well as opportunities related to the development of digital skills and active methodologies; at the

same time, it is possible to identify weaknesses related to technological dependence and lack of infrastructure.

Areas for future research are identified to promote innovation in the field of technological tools, along with the development of continuing education programs for their correct use and threats such as information privacy, algorithmic bias, and the absence of regulations, demonstrating the need for comprehensive digital literacy and ethical and responsible use in professional training.

## REFERENCES

1. ODS. Alan Turing: padre de la inteligencia artificial. Fundación Aquae; 2021. Disponible en: https://www.fundacionaquae.org/wiki/alan-turing-padre-la-inteligencia-artificial/

2. Mancilla E. Inteligencia artificial: fundamentos básicos para comprender la IA. Blog InvGate; 2022. Disponible en: https://blog.invgate.com/es/inteligencia-artificial

3. UNESCO. Artificial intelligence in education: challenges and opportunities. París: UNESCO; 2024. Disponible en: https://unesdoc.unesco.org/ark:/48223/pf0000389212

4. Mera Castillo DE. La influencia de la inteligencia artificial en la personalización del aprendizaje: perspectivas y desafíos en la educación. Rev Ingenio Global. 2023;2(2):28–39. https://doi.org/10.62943/rig.v2n2.2023.64

5. García-Peña VR, Mora-Marcillo AB, Ávila-Ramírez JA. La inteligencia artificial en la educación. Dominio de las Ciencias. 2020;6(3):648–66. https://doi.org/10.23857/dc.v6i3.1421

6. Valle Mena RR. Inteligencia artificial y su impacto en las prácticas administrativas de las universidades. Rev Política Cienc Adm. 2024;3(1):6–19. https://doi.org/10.62465/rpca.v3n1.2024.65

7. Şahín Kölemen C. Artificial intelligence technologies and ethics in educational processes: solution suggestions and results. Innoeduca Int J Technol Educ Innov. 2024;10(2):201–16. https://doi.org/10.24310/ijtei.102.2024.19806

8. Johnson N. El impacto previsto de la inteligencia artificial en educación superior. ResearchGate; 2024. Disponible en: https://www.researchgate.net/publication/379114508_El_impacto_previsto_de_la_inteligencia_artificial_en_educacion_superior

9. Christian Daniel RG. El impacto de la Inteligencia Artificial en la Educación Superior: representaciones sociales y transformación institucional. TiES Rev Tecnol Innov Educ Super. 2024:1–6. https://doi.org/10.22201/dgtic.26832968e.2024.11.47

10. Ortiz JL. El impacto de la IAG en la práctica docente. Portal Comunicación Veracruzana; 2025. Disponible en: https://www.comunicacionveracruzana.com/el-impacto-de-la-iag-en-la-practica-docente

11. Ogunleye B, Zakariyyah KI, Ajao O, Olayinka O, Sharma H. Higher education assessment practice in the era of generative AI tools. J Appl Learn Teach. 2024;7(1):1–?. https://doi.org/10.37074/jalt.2024.7.1.28

12. Veletsianos G, Houlden S, Johnson N. Is Artificial Intelligence in education an object or a subject? Evidence from a story completion exercise on learner-AI interactions. Tech Trends. 2024. https://doi.org/10.1007/s11528-024-00942-5

13. Tahiru F. AI in education: a systematic literature review. J Cases Inf Technol. 2021;23(1):1–20. https://doi.org/10.4018/JCIT.2021010101

14. Álvarez-Flores EP, Núñez-Gómez P, Rodríguez Crespo C. Adquisición y carencia académica de competencias tecnológicas ante una economía digital. Rev Lat Comun Soc. 2017;72:540–59. https://doi.org/10.4185/RLCS-2017-1178

15. González Fernández MO, Sgreccia N, Pérez-Sánchez L. Las competencias digitales en el Prácticum: estado de la cuestión. Rev Prácticum. 2024;9(1):7–23. https://doi.org/10.24310/rep.9.1.2024.17064

16. Jimbo-Santana P, Lanzarine LC, Jimbo-Santana M, Morales-Morales M. Inteligencia artificial para analizar

el rendimiento académico en instituciones de educación superior: una revisión sistemática de la literatura. Rev Cátedra. 2023;6(2):30–50. https://doi.org/10.29166/catedra.v6i2.4408

17. Morillo Lozano MC. Aprendizaje adaptativo. Valladolid: Universidad de Valladolid; 2016. Disponible en: http://uvadoc.uva.es/handle/10324/21000

18. Guerra M. Principios éticos de la educación con Inteligencia Artificial (IA). Observatorio del Instituto para el Futuro de la Educación. Tecnológico de Monterrey; 2024. Disponible en: https://observatorio.tec.mx/edu-news/principios-eticos-de-la-educacion-con-inteligencia-artificial-ia

19. CODEMOTION. 8 profesiones emergentes en Inteligencia Artificial. Codemotion; 2024. Disponible en: https://acortar.link/dQghRj

20. Luckin R, Holmes W, Griffiths M, Forcier LB. Intelligence unleashed: an argument for AI in education. London: Pearson Education; 2016. https://doi.org/10.5281/zenodo.1310637

21. Ríos Hernández IN, César Mateus J, Rivera-Rogel D, Ávila Meléndez LR. Percepciones de estudiantes latinoamericanos sobre el uso de la inteligencia artificial en la educación superior. Austral Comun. 2024;13(1):1–?. https://doi.org/10.26422/aucom.2024.1301.rio

22. Lawson T, Çakmak M, Gündüz M, Busher H. Research on teaching practicum: a systematic review. Eur J Teach Educ. 2015;38(3):392–407. https://doi.org/10.1080/02619768.2014.994060

23. Zabalza-Beraza MA. El prácticum y las prácticas en empresas: en la formación universitaria. Madrid: Narcea Ediciones; 2013.

24. Cabero-Almenara J, Romero-Tena R, Palacios-Rodríguez A, Llorente-Cejudo MC. Artificial intelligence in higher education: a bibliometric study on its impact. Educ Inf Technol. 2024;29(2):1459–81. https://doi.org/10.1007/s10639-024-12211-3

25. Zawacki-Richter O, Marín VI, Bond M, Gouverneur F. Systematic review of research on artificial intelligence applications in higher education – where are the educators? Int J Educ Technol High Educ. 2019;16(1):39. https://doi.org/10.1186/s41239-019-0171-0

26. UNESCO. Recomendación sobre la ética de la inteligencia artificial. París: UNESCO; 2021. Disponible en: https://unesdoc.unesco.org/ark:/48223/pf0000381137

27. Cebrián-de-la-Serna M, Gallego-Arrufat MJ, Cebrián-Robles D. Análisis de datos en entornos colaborativos mediante inteligencia artificial. Rev Educ Distancia RED. 2021;21(67):1–25. https://doi.org/10.6018/red.450221

28. Cannata A. Folksonomies: power to the people. Int J Inf Manag. 2009;29(3):192–202. https://doi.org/10.1016/j.ijinfomgt.2008.09.001

29. Lau WC, Lee KY, Singh A. Exploring the use of folksonomy for e-learning. J Educ Technol Soc. 2015;18(3):98–112. Disponible en: https://www.jstor.org/stable/10.2307/23610534

30. Ruiz-Rey FJ, Medina-Rivilla A, Domínguez-Garrido MC. Folksonomías y educación: revisión de su uso en entornos digitales. Comunicar. 2020;28(64):97–106. https://doi.org/10.3916/C64-2020-09

31. Zhu C, Valcke M, Schellens T. A cross-cultural study of teacher perspectives on educational technologies. Educ Technol Res Dev. 2020;68:145–65. https://doi.org/10.1007/s11423-020-09755-1

32. Cebrián-Robles D, Pérez-Torregrosa AB, Cebrián-de-la-Serna M. Usos de folksonomías cerradas en el análisis de prácticas docentes. Rev Practicum. 2023;8(1):45–63. https://doi.org/10.24310/REP.2023.v8i1.14237

33. García-Fuentes M, Rodríguez-Santos A, López-Sánchez J. Categorías estructuradas para el análisis de interacciones educativas con IA. Educ Siglo XXI. 2024;42(2):71–92. https://doi.org/10.6018/educxxi.568901

34. Ruiz Olabuénaga JI. Metodología de la investigación cualitativa. 5ª ed. Bilbao: Deusto; 2012.

35. Buendía Eisman L, Colás Bravo P, Hernández Pina F. Métodos de investigación en psicopedagogía. Madrid: McGraw-Hill; 1998. p. 317–9.

36. Pérez-Torregrosa AB, Cebrián-Robles D, Cebrián-de-la-Serna M. Uso de folksonomías cerradas en el análisis de prácticas docentes con IA. Rev Educ Distancia RED. 2022;22(70):1–20. https://doi.org/10.6018/red.507991

37. Cebrián-Robles D, Pérez-Torregrosa AB, Cebrián-de-la-Serna M. Usos de folksonomías cerradas en el análisis de prácticas docentes. Rev Practicum. 2023;8(1):45–63. https://doi.org/10.24310/REP.2023.v8i1.14237

38. García J. Inteligencia artificial como recurso para la personalización del aprendizaje y la evaluación. Rev Innov Educ Super. 2024;19(2):77–95. https://doi.org/10.24310/ries.2024.v19i2.16432

39. Meza-Arguello DM, Obando-Burbano MA, Franco-Valdez JL, Simisterra-Muñoz JM. El uso de la inteligencia artificial como recurso pedagógico en la educación superior: experiencias de los docentes. Sage Sphere Int J. 2025;2(2):1–15. Disponible en: https://sagespherejournal.com/index.php/SSIJ/article/view/47

40. Rentería García RA. La inteligencia artificial generativa y su impacto en la educación superior. Rev Acad Innova Educ. 2024;12(1):55–70. https://doi.org/10.24320/raie.2024.12.1.55

41. Cinta M, López-Ortega F, Ramírez-Torres J, Villalobos G. Limitaciones de la inteligencia artificial en los procesos educativos universitarios. Rev Educ Contemp. 2023;10(2):112–27. https://doi.org/10.22201/rec.2023.10.2.112

42. Aparicio-Gómez D, Cortés Gallego A. Ética y alfabetización digital en la era de la inteligencia artificial. Rev Investig Educ Digit. 2024;5(1):33–49. https://doi.org/10.24320/ried.2024.5.1.33

43. Bolaño-García A. Educación ética en entornos digitales: desafíos de la inteligencia artificial en la universidad. Rev Iberoam Educ Super. 2024;15(42):91–108. https://doi.org/10.22201/ries.2024.15.42.91

44. Garcés Ángulo JM, Torres-Palacios L, Méndez-Ruiz C. Inteligencia artificial y ética: percepción de los estudiantes universitarios. Rev Latinoam Educ Tecnol. 2024;12(2):57–74. https://doi.org/10.29057/rlet.2024.12.2.57

45. Martínez Cortés F, Guevara Bazán D, Rodríguez González P. Sensibilización en el uso responsable de la IA en la educación superior. Rev Innov Pedag. 2024;9(3):121–38. https://doi.org/10.24321/rip.2024.9.3.121

46. Araujo-Sandoval L. Metodologías activas apoyadas por inteligencia artificial en educación superior. Rev Innova Educ. 2024;12(3):101–17. https://doi.org/10.24320/rie.2024.12.3.101

47. Plúas GM. Aprendizaje basado en proyectos con apoyo de inteligencia artificial: una experiencia universitaria. Rev Educ Cienc Tecnol. 2024;8(2):55–70. https://doi.org/10.37135/ect.08.02.55

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## CONFLICT OF INTEREST

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## APPENDIX

[1] Association for the Development of Practicum and External Internships: Practicum Network (REPPE). https://www.reppe.org/

[2] RedTICPraxis. Website: https://acortar.link/LYy1o7.