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SYSTEMATIC REVIEW: GAI AND IMPACT ON THE SKILLS DEVELOPMENT IN UNIVERSITY STUDENTS

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ABSTRACT

In today's academic world, Generative Artificial Intelligence (AGI) has burst into universities in a surprising way in every way, its potential is transforming the teaching-learning processes. The objective of the research was to analyze how these digital tools allow the development of academic competencies in university students. Methodologically, the study includes a systematic review and meta-analysis, in which 57 current scientific articles were analyzed following the PRISMA guideline, which allowed exhaustive searches, based on exclusion/inclusion criteria that allowed data to be extracted according to the flowchart from the identification, selection and documentation of the research. These account for the benefits, opportunities and challenges that derive from its application in the university system. The results indicate that IAG encourages autonomous learning, improving the understanding of complex arguments, personalization of academic activities, at the same time, offers new ways of adapting to the educational process and in the classroom. Studies highlight a dependence on the use of these tools and their ethical management is questioned. The meta-analysis shows an Odds Ratio (OR) = 1.60 and Confidence Intervals (CI) 95% (1.35, 1.90), which shows a significant and positive association between the variables. It is concluded that it is not enough to incorporate artificial intelligence into academic processes. It is necessary to implement institutional policies, pedagogical processes in accordance with technological advances and continuous training for teachers and students. It does not have to go in the direction of replacing thought, but of strengthening cognitive faculties, reflecting and addressing new paradigms.

KEYWORDS: Academic Competencies, Education, Generative Artificial Intelligence, University Students.

1. INTRODUCTION

The emergence of digital tools such as GAI has shaken the educational context in recent years, modifying the reality, especially those of educational processes, since it is one of the sectors in which its impact is reflected at all educational levels, especially in higher education. These processes are related to the tasks that can be carried out by artificial intelligence, the personalization of learning and the dynamization of opportunities in the university experience. Monge et al. (2024) notes that GAI has the potential to change the educational experience, Mendoza et al. (2024); Mora & Arteaga (2023), at the same time, they argue that it influences the development of student capacities, promoting the production of adaptive content and its automation in learning processes. They also indicate that these important achievements in an increasingly digitized and competitive scenario in the educational reality, these academic skills become important in the insertion into the labor market of university graduates (Clemente et al., 2024; Anchundia et al., 2024).

Recent research has identified the use of artificial intelligence for different purposes and for almost every purpose in the university. Mera (2023) indicates that these digital tools allow a particularization of learning according to the requirements of the student and adapting to their rhythm. On the other hand, research affirms that the management of GAI in educational contexts allows individual learning and peer help (Salvatierra et al., 2021). It encourages the implementation of new forms of innovative consultancies, fostering dynamic and more receptive academic contexts (Farfán et al., 2023). Along these lines, Ogosi (2021); Mendoza et al. (2024) They argue that virtual assistants and chatbots can be used to provide academic support in real time, demonstrating improvements in the achievement of academic competencies and satisfaction in student results.

Despite the advances in this area, there are gaps in relation to the knowledge and analysis of the use of artificial intelligences for academic purposes in the development of competencies. Estrada et al. (2024) and Sánchez et al. (2024) They focus on specific aspects of the use of artificial intelligence, neglecting a deeper reflection on the development of academic skills. Avoiding analyzing how these tools can be added to the higher education experience (Clemente et al., 2024). On the one hand, there are few studies on the ethical repercussions derived from the dependence on artificial intelligence within the educational context (Bastidas et al., 2024; Ortiz & Cutimbo, 2022). Researches such as that of Pérez et al. (2024); Chao-Rebolledo and Rivera-Navarro (2024) addressed aspects related to the personalization of learning through artificial intelligence, devoting less attention to understanding the real impact of these adaptations on students' critical, ethical and interpersonal skills. The lack of sufficiently defined theoretical models linking the use of artificial intelligence in education to comprehensive academic development highlights the importance of adopting a more structured approach to thoroughly examine these interrelationships (Dávila, 2023).

As referred above, the purpose of the research is to analyze the use of generative artificial intelligence in the development of academic competencies in university students. Like Clemente et al. (2024); Gioco et al. (2023) this study aims to fill gaps described by identifying not only the effectiveness of AI as educational resources, but also; at the same time, its impact on comprehensive education and its preparation for the demands of the workplace (which is academic skill). It is expected that the contribution will allow the development of pedagogical frameworks that effectively incorporate AI in higher education, thus consolidating its role as an ally in the training of future professionals (Anchundia et al., 2024; Dávila, 2023). To this porpuse, the research aims to answer the following questions: How does generative artificial intelligence influence the development of specific academic competencies in university students? What are the perceptions of university students about the use of generative intelligence tools for their learning? What ethical challenges does the use of generative artificial intelligence tools face in the academic training of university students?

2. METHOD

The systematic review and meta-analysis, according to the protocols, has followed the PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which establishes specific procedures for the selection and reporting of the systematization. The exact Boolean search stringsfor research that combine the keywords are: academic competencies, education, generative artificial intelligence, and university. They are constituted to search academic databases such as Scopus, Web of Science, Scielo, Eric, Google Scholar and Latindex:

Boolean search strings in Spanish:("academic competencies" OR "academic skills") AND ("higher education" OR university OR) AND ("generative artificial intelligence" OR "generative AI")("generative AI" OR "AI tools") AND ("academic background" OR "academic performance") AND ("higher education") AND ("competencies") ("generative artificial intelligence" OR "generative AI") AND ("education" OR "university teaching") AND ("academic competencies") AND (university OR "university students").

Boolean search strings in english: ("academic competencies" OR "academic skills") AND ("higher education" OR "university students") AND ("generative artificial intelligence" OR "generative AI") ("generative artificial intelligence") AND ("education") AND

("academic competencies") AND ("university students")"generative AI" OR "AI tools") AND ("academic performance" OR "academic competencies") AND ("college students" OR "university education".

Chains for generative AI impact studies: ("generative AI") AND ("learning outcomes") AND ("academic competencies") AND ("higher education")"generative artificial intelligence") AND ("educational impact") AND ("academic competencies") AND ("university level"). The search for articles (publications between 2021 and 2025) was limited, since in the last five years these digital tools emerged and were released. To ensure systematic review, as they point out Area-Moreira et al. (2024); Salguero and García (2024); Camacho et al. (2023) and Tamayo et al. (2024), relevant and recent research in the line of artificial intelligence applied to higher education must be incorporated. The studies analysed are directly related to GAI in higher education.

Within the inclusion criteria, high-quality open access studies were selected in the thematic line of the study to ensure their relevance. Empirical studies, systematic reviews and original articles that explicitly address the role of GAI's tools in the process of achieving university students' skills were considered. Publications that were in line with higher education and that were subjected to peer evaluations were taken into consideration to guarantee their rigor and reliability of the results delivered (Incio et al., 2021; Esteves et al., 2024). At the same time, within the exclusion criteria processes, studies that did not establish a clear and direct link with the research topic were omitted, in the same way all types of research that have not gone through a review process, within these criteria published articles were analyzed in English and Spanish (The first was because it is the universal language, and the second involved analyzing and writing the research.), in this way, the coherence and interpretation of its contents were maintained (Vélez-Rivera et al., 2024).

For the research, 150 articles from different databases and journals were selected, according to the exclusion and inclusion criteria, 57 relevant works were chosen. A detailed analysis of the content of the articles referred to was carried out, considering the analysis of the methodological design, relevant results and thematic gaps in them. In this perspective Muñoz and Martín (2024); Cruz et al. (2024); Espinosa-Cevallos et al. (2024) they point out that research accounts for how the GAI shapes the teaching-learning processes in university education. The systematic review was rigorously carried out to contribute to current knowledge and from this to formulate questions regarding the impact of IAG in higher education.

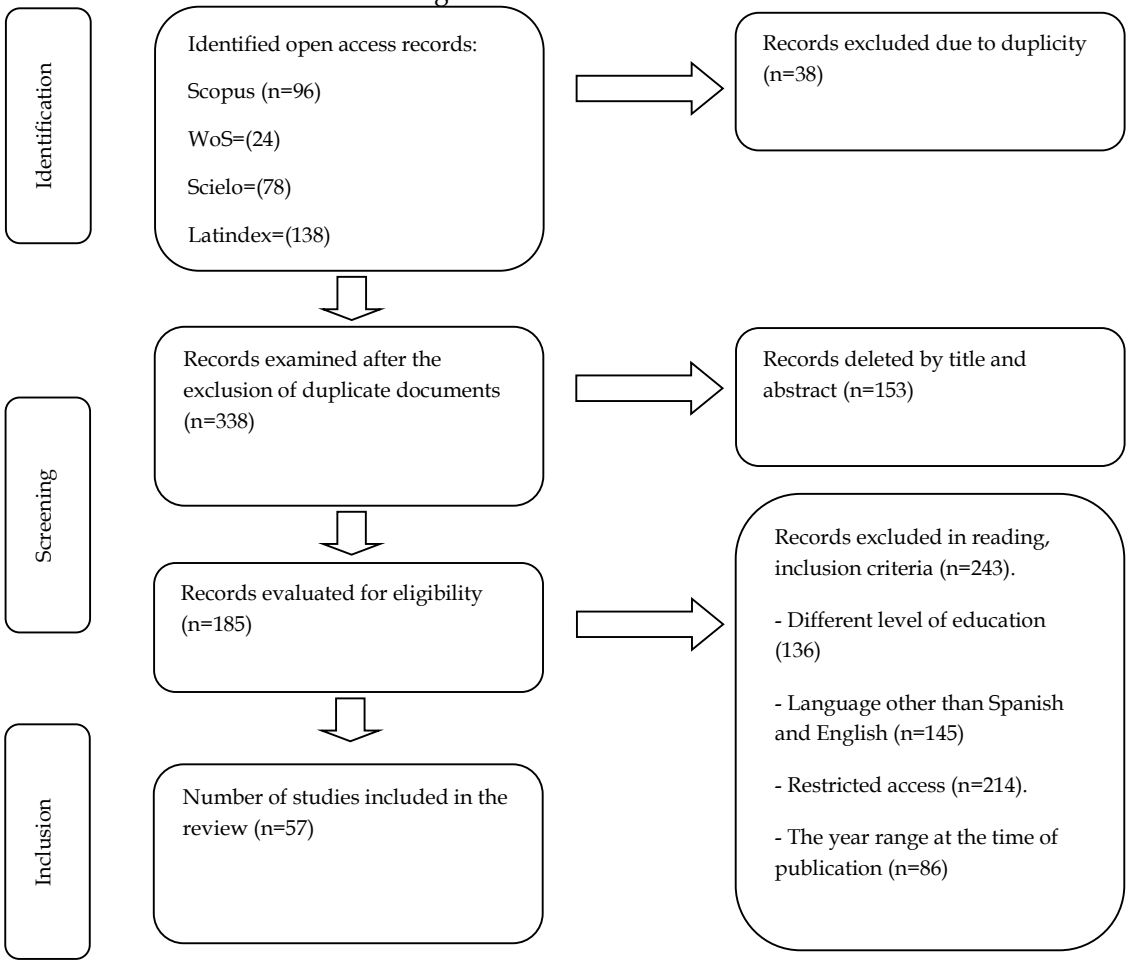

Figure 1: PRISMA Flowchart, Selection and Exclusion Process from the Systematic Review.

3. RESULTS

Research Question 1: How does generative artificial intelligence influence the development of specific academic skills in university students?

3.1. The Impact of GAI On the Development of Academic Skills

There is a direct influence of generative artificial intelligence on the processes of development of academic skills and at the same time it is a growing topic of interest in the educational field. For his part Saz-Pérez et al. (2024) indicate that the use of these digital tools is valid and reliable in the evaluation of knowledge in pedagogy. On the other hand, they found that the use of GAI's tools significantly improves analytical and problem-solving skills in students from different disciplines (Camacho et al., 2023). Among the most relevant findings, it stands out that 78% of students reported better understanding of their subjects thanks to the use of GAI; however, they also mentioned some fear of relying too much on these AI tools. About that Muñoz and Martín (2024), the consequences of the proper use of these tools as a teaching method in university life must be analyzed.

In a study conducted by Chao-Rebolledo and Rivera-Navarro (2024), uses and perceptions of AI in higher education were analyzed, the results show that at least 33% of students and 20% of teachers use some AI tool. In this sense, studies corroborate an impact on the development of learning, facilitating academic life, positively impacting the integration of these tools, it should be noted that there is no reflection on the ethical implications of the use of AI. Several studies point to a positive correlation between the implementation of generative artificial intelligence and the increase in academic performance in students. On the other hand, Sánchez and Carbajal (2023) point out that; a "wide range of factors threaten the correct and responsible use of AI, produced by misinformation or malicious use, these can be described as paradoxical processes due to the contradictions and challenges inherent from its conception to its relationship" (p. 77). Based on what has been indicated, there are still thematic gaps on the long-term impact on the use of GAI and its relationship with critical thinking and creativity skills in university students.

Table 1: Important Articles About the Impact of AI On Academic Skills.

Author	Year	Methodology	Outstanding results	Thematic gaps
Garcia	2025	Document analysis	AI improves academic performance, reducing emotional stress and is related to possible dependency.	Different visions of the role of AI, possible algorithmic biases and its constant study is crucial.
Muñoz and Martín	2024	Systematic review	There is great interest in AI, it is associated above all with the university.	Studies on the correct use of AI are required.
Diaz et al.	2024	Bibliographic review with descriptive and comparative scope	AI provides immediate insights, processes data quickly, becomes a potential support, generates ideas, empowers skills, and is accurate.	There is a lack of consensus to integrate AI into curricula. Lack of privacy and data security, digital divide, researcher does not always discern content, loss of creativity and sensitivity.
Jardón et al.	2024	Systematic review, PRISMA	It optimizes resources, allows you to personalize teaching-learning and improves accuracy in evaluation.	There are limitations to assessing complex skills and poses ethical and regulatory challenges.
Kroff et al.	2024	Quantitative approach with surveys.	It offers benefits, optimizes time, provides immediate feedback, continuous evaluations and its efficiency.	It is not yet widespread, there are barriers, the need for implementation protocols, lack of training for students and teachers.
See	2024	Deductive within a humanistic paradigm	Artificial intelligence automates administrative tasks and optimizes teaching.	Its proper use requires conscious and ethical reflection.
Aljuaid	2024	Systematic review	In writing, he considers works of great relevance and scope.	Jobs on AI are related to academic writing.
Camacho et al.	2023	Exploratory qualitative study	Reflect on the use of AI in the understanding of university students.	Dependence on technology in students.
Pacheco-Mendoza et al.	2023	Projective and predictive model	The use of AI is demonstrating a positive influence on academic performance.	Limitations in academic integrity.
Velastegui et al.	2023	Theoretical review.	The use of AI is corroborating a favorable effect on student performance.	They raise new horizons that are not precisely detailed.

The reviewed articles directly analyzed the topic of interest, being the focus the impact of GAI on university education, these documents analyze the benefits and opportunities that AI brings with it, among some stand out are; instant feedback, efficiency in task optimization, improvement in academic performance and personalization of learning. The sources agree that there is an interest

in taking on the implementation of AI in the field of education with a challenge, the most worrying being its ethical use and privacy. On the other hand, it highlights the need to implement AI training for teachers and students. However, the possible dependence on digital tools, inequity in access, algorithmic biases and transparency in the wording are evident. This calls for the importance of an ethical and responsible integration of artificial intelligence into education in general, not just higher education. Emphasizing the need to establish policies, clear guidelines to maintain a balance between the use of technology and human interaction for the development of critical skills in professionals.

Table 2: AI In Higher Education; Progress, Challenges and Future.

Advances and applications	Learning Personalization	Adaptation to individual needs
		Learning Rhythms and Styles
		Adaptive learning paths
		Adjusted content and activities
		Greater commitment and autonomy
	Teaching Optimization	Automating administrative tasks
		Schedule management
		Proofreading
		Freeing up time for teachers
		Focus on strategic and pedagogical activities
	Improved assessment	Automatic evaluation
		Proofreading of exams and assignments
		Reduction of correction time
		Minimization of human errors and biases
		Greater objectivity and fairness
		Instant feedback
	Educational Content Creation	Generation of interactive and dynamic content
		Advanced simulations
		Custom tasks
		Enhancing autonomous learning
	Skill development	Technical skills (programming, data analysis)
		Interpersonal/soft skills
		Communication
		Teamwork
		Troubleshooting
		Critical thinking
		Creativity
		Continuous adaptation
	Predictive models	Predicting academic performance
		Identification of students at risk of dropping out
		Student Data Analysis
		Predictive variables (age, hours/days, use of AI tools)
	Human-AI collaboration	AI as a complement to the teacher
		Empowerment of teaching
		Balancing technology and human interaction
	Psychological support and well-being	Decreased test anxiety
		Boosting positive academic emotions
	Improved language and grammar skills	Academic writing assistance
		Grammar check
		Plagiarism detection
		Language Translation
Challenges and concerns	Ethics and privacy	Use of Student Data
		Data Security
		Biased algorithms
		Transparency in the use of AI
		Protecting Student Rights
		Academic integrity (plagiarism, cheating)
		Attribution of authorship
		Lack of clear regulation
	Implementation	Lack of teacher education and training
		Resistance to change
		Investment in infrastructure and resources
		Technical problems
		Need for continuous monitoring

	Impact on human skills	Reduction of critical and creative thinking
		Over-reliance on technology
		Decreased complex problem-solving skills
		Less human/personalized interaction
		Loss of sensitivity and emotional connection
	Digital divide and equity	Exacerbation of socio-economic inequalities
		Unequal access to technology and training
		Favoritism for students with advanced resources
	Labour market	Task and role automation
		Rapid Skill Obsolescence
		Increased competition for positions
	Educational Quality	Risk of Reduced Educational Quality
		Oversimplification of evaluation
		Risk of understatement of actual values (In predictive models)
	Negative perceptions	Difficulty adapting to constant changes
		Decreased motivation or interest in automation
	Risks	High risk of cracking/security breaches
Prospects and future	Need for balance	Combining AI with traditional educational approaches
		Prioritizing Human Judgment
		AI as a support tool, not a substitute
	Recommendations	Continuous training for teachers and students
		Clear and transparent ethical policies
		Investment in infrastructure and resources
		Implementation of standardized protocols
		Fostering collaboration (universities, government, private sector)
		Promoting AI literacy
	Role of the teacher	Guidance and complementing the use of AI
		Development of critical and creative skills
		AI Output Monitoring
	Ongoing Research	Assess long-term impact
		Analyze teacher perceptions in depth
		Study ethical and privacy issues in detail
	Future educational models	Hybrid approach (technical + interpersonal)
		Adapting to the evolution of AI
		Ensuring equitable and inclusive education
	Regulatory framework	Need for clear regulations and guidelines

Research Question 2: What are college students' perceptions of using generative intelligence tools for their learning?

3.2. Student Perception of the IAG

Studying students' perceptions of the use of generative AI tools has revealed valuable insights into technology adoption in learning. According to the work of Ruiz et al. (2024) through surveys, students consider that GAI improves their educational experience, allowing them to access information and resources in real time, 86% of students make use of the aforementioned tools in academic activities and they are useful for autonomous learning. However, a concern regarding the reduction of human interaction in the teaching process, for Vega et al. (2021) There is a growing need for the use of digital and research skills more and more.

On the other hand, the research of Soto and Reyes (2024) showed that the use of chat GPT is predominantly oriented towards the creation of texts and the verification of academic concepts. The methodology of this study included qualitative collection through interviews, where it was evidenced that students positively value its use in improving the use of AI for the completion of tasks. On the other hand, students require support in the production of writings and data analysis (Cifuentes et al., 2023), for that purpose artificial intelligence is unavoidable with different options that are available.

Table 3: Relevant Studies on Student Perception Of AGI.

Author	Year	Methodology	Relevant result	Thematic gaps
Niño-Carrasco et al.	2025	Cross-sectional description	Students acquainted with GAI, but with limited academic theoretical knowledge. Time savings are valued and there is uncertainty in the impact on learning.	Lack of empirical evidence on the impact on deep learning.

Romeu et al.	2025	Mixed methodology, comparative study	Specific training on GAI improves self-perceived knowledge. Age and previous training do not influence knowledge, chatGPT is the best-known tool, AI training modifies the perception of critical aspects.	Need for more in-depth studies on causes of changes in ethical/critical perception. Need to investigate real impact on the acquisition of digital skills and studies on teachers' perceptions.
Ruiz et al.	2024	Survey and focus groups	86% of students use IAG in the production of texts.	Perception of reduction in human interaction.
Mena-De la Rosa et al.	2024	Mixed, descriptive, non-experimental, cross-sectional approach	High interest in using AI as a learning aid, they perceive it as useful but potentially harmful if misused. They are neutral about chatbots in digital literacy. 80% recommend AI for teaching-learning.	Institutions must give clear guidelines and ethical standards. It requires more exhaustive studies and a continuous need in the ethical debate.
Soto and Reyes	2024	Surveys	GAI is mostly used for text creation.	Rapid reliance on AI
Ka-Yuk and Hu	2023	Exploratory cross-sectional design	Positive attitude to GAI, potential benefits in writing and research, High expectations regarding skills.	Self-reported data can be biased. Need for longitudinal research with representative and diverse samples.
Baidoo-Anu et al.	2024	Factor analysis (EFA, CFA) and ANOVA	Students aware of the potential of GAI, over-reliance and lack of originality. There are no significant differences in perceptions according to gender, age, or educational level.	They recommend follow-up interviews and explore teachers' perspectives.
García-Peñalvo et al.	2024	Systematic review, benefit analysis, and interventions	The GAI is powerful but susceptible to errors/hallucinations, worried universities but students and professors already use AI while policies are lacking. Not to prohibit, but to enable ethical/critical use. He points out risks such as superficial learning, impediment to creative critical thinking, dishonesty, among others	Quick, but not exhaustive, reviews are based on literature analysis and not on direct primary data.
Ríos et al.	2024	Exploratory, descriptive and cross-sectional study	80% of Latin American students accept the potential of AI, more than half believe that it can reduce inequality, the lack of clear policies is a concern and a constant concern about ethics, plagiarism, originality, reliability, privacy, bias and impact on processes of high cognitive demand.	Sample limited to only 3 Latin American countries, which restricts generalization. Self-administered surveys limit depth. They recommend mixed methods for more depth and ethical debate.

University students have generally positive knowledge and are familiar with GAI technologies in their everyday lives. They recognize the significant potential of generative artificial intelligence to impact higher education and have a favorable attitude toward its use in learning. University students perceive numerous benefits of GAI in the academic field, these include; Personalized and immediate support for learning, Assistance with tasks such as writing, brainstorming, research and analysis. Improved efficiency and time savings in academic tasks, development of important digital skills. It helps in the understanding of difficult concepts and provision of new perspectives, however, there are also significant concerns and perceived challenges.

The most outstanding are:

- Ethical and academic integrity issues, such as plagiarism and lack of originality, for fear of over-reliance on technology.
- The potential negative impact on the development of skills such as critical thinking, creativity, and originality, for fear of over-reliance on technology.
- Concerns about the purpose, accuracy, and transparency of the generated information.
- Risks related to data privacy and security.
- Concerns about the digital divide and inequality in access to and use of advanced tools.
- The absence of institutional policies and clear guidelines on how to use the IAG appropriately in the academic setting.

Studies indicate that students are enthusiastic about the general possibilities for learning, often have uncertainty or neutral stances about how GAI improves very specific aspects of their academic performance or the quality of their work, possibly due to a lack of in-depth experience with specific educational uses. Most report not having received formal training or guidance on the safe and effective use of generative AI in their institutions. Studies suggest that; Understanding these diverse student perceptions is essential for institutions and

managers to develop policies, guidelines and training programmes that enable ethical, effective and equitable integration of GAI into university higher education.

Research Question 3: What ethical challenges and defiances does the use of generative artificial intelligence tools face in the academic training of university students?

3.3. Ethical Challenges in the Use of GAI In Academic Training

The use of generative artificial intelligence in the university system presents important ethical challenges that deserve to be addressed. From the position of Gallent-Torres et al. (2023) They focus their position on academic integrity, dishonesty, pointing out that 85% of teachers show their concern about the excessive and non-transparent use of these tools. The research in question was carried out from a qualitative analysis, in which university professors reveal the need to implement real policies, which can regulate the use of GAI in higher education. We can highlight the risks and benefits that are linked to these tools in learning experiences, they can facilitate teaching, they can also cause misinformation if they are not used appropriately. This is why it is important to form a critical digital citizenry, which differentiates valid information from misleading information.

Table 4: Relevant Studies of the Use of Hais in Higher Education.

Author	Year	Methodology	Relevant result	Thematic gaps
García-Peñalvo	2024	Literature review, interviews, direct observations.	The discussion focuses on how to teach and to learn in the age of AI and how this is revolutionizing higher education, offering opportunities, but also mistrust and risks.	The challenges involve ongoing areas of research and adaptation. Demand for flexible and adapted policies.
Perezchica-Vega et al.	2024	Quantitative, non-experimental, cross-sectional	Teachers are concerned about academic integrity. There are facilities in data analysis, didactic material and idea generation.	Quantitative methods do not reach the depth of the case. Opportunities for studies with diverse samples and most have not yet adjusted their evaluation mechanisms.
Hadi et al.	2024	Qualitative, social media content analysis	It is assumed that the GAI is an auxiliary tool for teachers and does not replace it. Integrity is a concern.	They do not represent all demographics; there are gaps in future lines of research and studies on the influence on learning.
Yusuf et al.	2024	Mixed methods	There is awareness and familiarity with GAI in higher education. The primary use for information retrieval and paraphrasing. The main concern: academic dishonesty and the need for ethical guidelines.	The reduction of culture to a few dimensions is a simplification. Culturally adapted policies are important areas for ongoing research.
Abidi	2024	Exploration and reflection	The challenges and opportunities of university education are recognized. The teacher is still central, it is not replaceable, ignoring or prohibiting AI is not viable, educational reform and responsible use of these are needed.	The study does not show thematic gaps or future lines of research. But he stresses that the IAG requires further research and development.
Franganillo	2023	Exploratory review of sources and reflection	GAI enables the automated production of high-quality content. It has implications and poses ethical, legal, and social challenges.	There are limitations and risks in the media. Expand the socio-economic and cultural impact and analyze the technical challenges.
Gallent-Torres et al.	2023	Qualitative interview	Concerns about academic integrity and plagiarism.	Need for clear policies on the use of AGI.
VanderLinde y Mera	2023	Qualitative, documentary/bibliographic review	AGI has the potential to revolutionize higher education. It raises ethical/moral concerns: fraud, plagiarism, deception, academic reliability/validity, outsourcing of tasks. Urgent need for debate.	It lacks of solid evidence on the implications of AI in higher education, until 2023 there was a gap in Latin America. It shows a need for more research and comprehensive debate on uses, threats and limitations.

Gutierrez	2023	Qualitative (Questionnaire to GAI users via text via Twitter)	The GAI has transformed interactions with information and access to knowledge; its use implies ethical challenges and concerns about misinformation and bias. Most consider it valuable for learning and research. Need to debate ethics and regulations.	The research presents partial results, The high rate of indecision in some questions of the survey suggests that the perception of users is in formation, which could be an area to deepen in future research.

These challenges regarding the GIA address the impact on the university educational environment, the recurring points that stand out in the sources have to do with the rapid irruption and exponential advance of artificial intelligence tools, such as ChatGPT and other similar ones. The numerous opportunities and benefits of artificial intelligence in academic training, teaching, learning, research and administrative processes improve efficiency, personalization of learning and content generation. The significant challenges, risks, and ethical concerns posed by their use, particularly in relation to academic integrity, plagiarism, fraud, and the reliability of the information generated. This requires that educational institutions, especially higher education (due to the level of professionals in different specialties) adapt to the management of these technological resources with integrity, entails reviewing their policies and clarifying their ethical and responsible use of GAI.

3.4. Meta-Analysis Regarding GAI And Academic Competencies

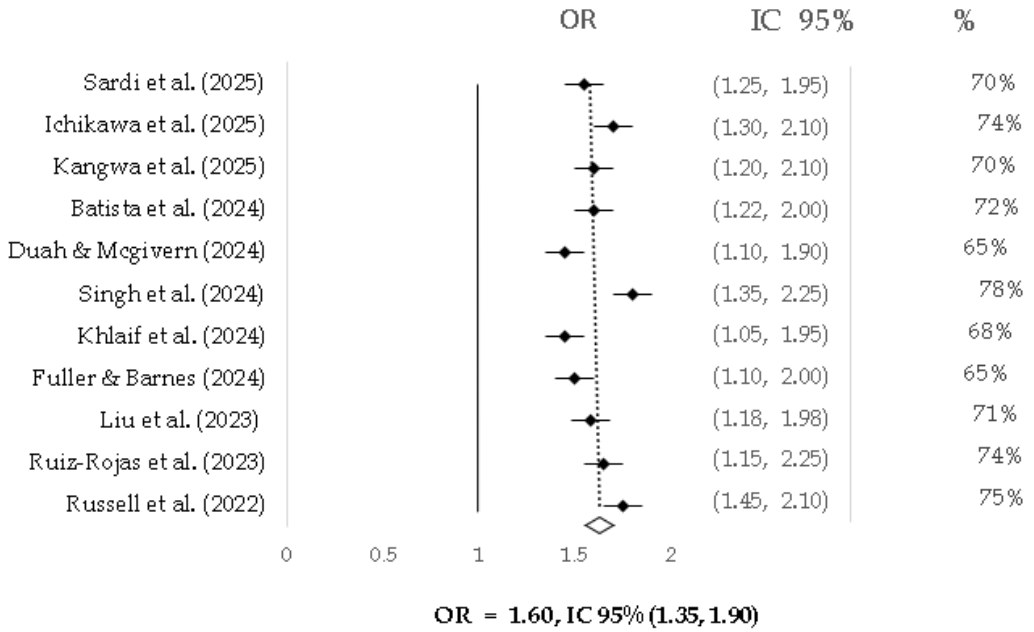

Figure 1: Forest Plots on IAG And Skills Development.

Regarding the analyzed articles according to the meta-analysis, the effect size (Hedges' g) and the confidence intervals (95% CI). The results come from an analysis of 11 studies, considering the combined effect or confidence interval g=1.60, 95% CI (1.35, 1.90). The analysis points to a consistent and positive effect of the GAI on the strengthening of university students' competencies. Effective use significantly improves their performance, achieving a significant Odds Ratio (OR) (meaning that there is no relative risk when using generative AI in the training processes of future professionals, on the contrary, its effect is positive on the development of academic competencies and professional performance, at least this is shown in the % effects ranging from 65 - 78) and this leads to technologies being able to improve educational skills. Therefore, its incorporation into education is being quite significant in different areas of knowledge and by all its agents (teachers, students and the community).

The results indicate that the most impactful competencies that university students are developing are: digital literacy, creativity, critical thinking and autonomous learning. Regarding the use of AGI tools, research reports that the most prevalent are Midjourney, Grammarly, Perplexity, ChatGPT, Dall-E, Copilot, NotebooK LM, Bard, Scite, Elicit, SciSpace, Gemini, Research Rabbit, txyz and among others. The research refers to the academic contexts where they are used, such as in medicine, communication, social sciences and engineering. At the same time, studies show that the

GAI improves the autonomy of university students with immediate feedback, enhancing their creativity with respect to work related to design, content writing and solving problems raised in their training. This raises concerns about ethical use, mitigating risks, functional dependence on technology, and biases in its results, and require further debate to integrate legislation appropriately into this universe of possibilities.

4. DISCUSSION

The arrival of GAI in the educational field, especially in universities, shows a transformation in their skills development processes. Viera (2024) points out that the irruption poses new challenges in university education and that they are linked to the ethics and posture of students. Answering the concern of the first question, they indicate that these digital tools are favorable in the development of student skills (García, 2025). On the other hand, Pacheco-Mendoza et al. (2023) point out that the GAI favorably influences the management of grammatical and linguistic abilities and therefore the mastery of analytical skills. Especially when they write for academic purposes, when specifying the content (Ríos et al., 2024) and when identifying complex arguments during the study (García-Peñalvo et al., 2024). In this sense, Díaz et al. (2024) note that GAI can potentially promote critical thinking and creativity. They recognize its effectiveness in supporting the resolution of arithmetic problems and encourages the improvement of computational abilities (Díaz et al., 2024). On the other hand, there is a concern that these tools have a negative influence, establishing superficial learning, with little or no reflection, to García (2025) it could even affect the student's intrinsic motivation. This can cause technological dependence and a decrease in the development of critical thinking and creativity (Niño-Carrasco et al., 2025).

Regarding question two, the perception of university students about the management of GAI in their learning process is quite varied, there is a favorable and receptive majority tendency (Ríos et al., 2024). University students show a fairly significant interest in artificial intelligence in their education, in which they are aware of the benefits in the personalization of learning, time savings, and their efficiency in the search for information (Viera, 2024) and as Gallent-Torres et al. (2023a) point out, immediate feedback. Also Niño-Carrasco et al. (2025) value the idea that GAI allows the development of digital skills and argue that students have expectations that their teachers will use it in the classroom. On the other hand, there is also a lack of clarity in students about what exactly GAI is and how to apply it effectively in educational contexts. From this point on, the need to debate the ethical implications is a common concern (Mena-De la Rosa et al., 2024). These significant issues among students include truthfulness of information, bias, privacy, and over-reliance (Velastegui et al., 2023).

Regarding the third question, linked to the ethical challenges of GAI in academic training, Gallent-Torres et al. (2023a) highlight that the use of generative artificial intelligence in university education faces main challenges that have to do with ethics. For García-Peñalvo et al. (2024), academic integrity, fraud, and plagiarism are core interests, specifically in AI writing. Similarly, Kroff et al. (2024) state that the security and privacy of student data is another critical challenge, in turn, they reflect on discrimination, bias, lack of transparency and digital divide in access to digital tools. Along these lines, Niño-Carrasco et al. (2025); Abidi (2024) take on a crucial challenge to overcome technological dependence, human decline linked to social interaction and critical thinking. Jardón et al. (2024) indicate that a clear regulation of the GAI should be assumed as a priority, along the same lines, Romeu et al. (2025) pose challenges to implement policies in accordance with technological advances. Promoting training on digital literacy for teachers and university students would allow important steps in its ethical and effective use (VanderLinde y Mera, 2023). The role of those who assume teaching must change, adapting to procedures or methodologies that allow interaction with their students (Mena-De la Rosa et al., 2024). In this sense, Velastegui et al. (2023) reflect on the importance of providing a proportionality between innovation and the humanistic approach in education. Gutiérrez (2023) highlights that it definitely requires a deeper analysis of the virtues, potentialities of the GAI in the substitution of roles in teachers and students.

5. CONCLUSIONS

According to the systematic review and meta-analysis, it has been found that generative artificial intelligence improves the ability of university students to understand content and analyze them. Thus, encouraging the need to develop new self-learning capabilities, which are permanently adapted to new technologies. The results of the research indicate that these tools are interactive, personalize learning according to need, provide feedback, automate repetitive and administrative processes. This, from educational practice, promotes teaching-learning processes in an innovative way by using accessible and dynamic tools, allowing a pleasant experience for students and teachers.

Therefore, artificial intelligence is increasingly becoming an important and necessary tool to optimize time, generate educational resources and overall, for its potential to prepare students in a reality that is increasingly digital and interconnected to the world. Highlighting a significant development in the achievement of academic skills.

The students have expressed favorable and unfavorable positions regarding the use of the IAG, accepting the application of an ethical framework and the need for transparent and responsible regulation in its management. This denotes the need to implement institutional and governmental policies for optimized use in higher education. These issues require an exhaustive analysis by experts and managers of university education in the purpose of developing competencies. The studies show that artificial intelligence tools are transforming the ways of teaching and learning, as well as identifying critical areas in order to improve the university experience.

In the analysis of the research, concerns and potential benefits were detected regarding the use of generative artificial intelligence in university education. The opportunities they offer in the formation of academic competencies are well documented, their integration must be following strategic procedures, which allow guaranteeing and carefully managing their use ethically. Its reflection and methodological adaptation in the teaching-learning processes allow its benefits to be optimized in the academic context, thus avoiding risks that have to do with integrity and its negative impact on university education.

It is important to highlight the irreplaceable role "still" of the teacher, under its prerogative, an appropriate, responsible and critical use of these digital tools can be guaranteed, its management must contribute favorably to the achievement of skills in students in this digital era. In this scenario, it is necessary to implement teacher training programs and innovative adherence to students' curricula in the responsible management of GAO. Analyzing permanently their impact from a holistic perspective are challenges for research and higher education.

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