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Systematic differences between students and teachers regarding generative artificial intelligence in online learning environments

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Abstract

Generative Artificial Intelligence (GAI) is transforming higher education, yet meaningful comparison of perspectives between teachers and students remains limited. With the aim of shedding light on their interaction as a specific shared space to agree about GAI pedagogical significance and further practices, this study analyzes perceptions, uses, and perceived usefulness of GAI among university students (n = 235) and their teachers (n = 36) in online learning environments. Two isomorphic surveys combining Likert-scale and open-ended items explored four dimensions: learning optimization, educational management, assessment, feedback, and content creation. Results reveal a consistent gap: students show greater enthusiasm and more frequent use of GAI, whereas teachers remain cautious, often resorting to avoidance or substitution strategies. Students mainly value GAI's capacity to simplify repetitive academic tasks, while teachers see its potential particularly for enhancing feedback processes. However, students' predominantly superficial use may limit the long-term scalability of its benefits. The study highlights the need for gradual and pedagogically coherent integration of GAI in online higher education through teacher training, instructional co-design, and strategies to bridge expectation and practice gaps.

Mathematics Subject Classification (2020)

1 Introduction

Although inherently related, the processes of teaching and learning do not always progress in perfect synchrony; indeed, in certain educational approaches, these actions may not unfold in an intrinsically coordinated manner on all levels. It is therefore to be expected that, when addressing a topic as consequential as generative artificial intelligence (GAI) in online formal education, discrepancies may arise between teachers and students. Naturally, teachers and students occupy different educational roles, yet they reach a psychological and pedagogical agreement when it comes to their educational interaction, ensuring that the process is carried out effectively. It is precisely at this complex juncture of alignment and negotiation that we situate our study, seeking to contribute to an understanding of their perceptions, uses, and the perceived usefulness of GAI (Rienties et al., 2024; Sun et al., 2025) within the broadly promising outlook for its educational future (Wu et al., 2024). Broadly speaking, current perspectives appear somewhat more optimistic among students than among teachers (Puche-Villalobos, 2024), and students' prior experiences in online environments at least partly shape their acceptance of technological teaching assistants (Kim et al., 2022). With respect to actual use, a clear asymmetry emerges between the two groups in educational practice: students employ GAI frequently, and in some cases excessively (Trinity College, 2024), whereas teachers—speaking generally—remain reticent, often displaying avoidance or cautious respect toward this technology (Cardona et al., 2023). Concerning perceived usefulness, while much remains to be defined, there appears to be a delicate balance: students benefit from the tool to accomplish many of their supposedly tedious and time-consuming academic tasks (summarizing, searching for literature, etc.), whereas teachers express hope that, in the near future, GAI may facilitate some of their most critical teaching responsibilities,

particularly student feedback (Roe et al., 2024). Additionally, relevant inconsistencies emerge in recent studies regarding the expertise of teachers and students in this field, which justifies the present investigation. For instance, computer science faculty appear more confident and proactive in their use of the technology compared to instructors in other disciplines, as might be expected, yet they do not demonstrate greater accuracy in detecting work produced with GAI (Ghimire et al., 2024). Students, meanwhile, display high proactivity in adopting GAI, but they often fail to refine the outputs they obtain, remaining at a basic level of the technology's potential. In other words, they settle for rudimentary use of GAI (Burner et al., 2025)—a pattern which, if firmly established in the early stages of adoption, may prove difficult to scale up in the future.

2 Research Objective

This study is undertaken with the aim of clarifying the projected mental image that helps visualize expectations and actual uses of Generative Artificial Intelligence (GAI) as perceived by the two educational groups involved in the teaching–learning process. Accordingly, this article reports, under a common analytical framework, how teachers and students declare in parallel the ways in which they behave with respect to GAI, and how they might (or should) act when facing this generative tool. We do not anticipate convergence nor attempt to measure inequalities between roles; rather, our goal is to capture the specific moment in which each group stands, constructing a reasoned collective snapshot projected into the future. Within the broader field of generative intelligence in education, this study presents findings from research conducted in the context of online higher education, through a situated comparison that highlights distinctive features of these collective snapshots, given their potential for psychopedagogical disruption and their impact on educational relationships. The objective is to identify elements of educational intervention that explicitly inform the interplay between teaching and learning online, under an equal analytical framework for teachers and students, by presenting them with the same tasks to be evaluated from their different roles in a shared teaching–learning space. Although this topic has been approached from different perspectives and by diverse research groups, most studies have focused on only one of the two key actors in the educational process: either teachers or students. On the student side, recent representative research highlights personalization as a means of supporting learning, the development of search and analytical skills, and concerns about ethics and social values that also extend to their perception of teaching (Chan & Hu, 2023). On the teacher's side, numerous studies emphasize issues such as academic dishonesty, tool dependency, and the evaluation of learning —particularly feedback—which is often framed both in terms of personalization and automation (Freitoza, 2025). At these early stages, both groups may be seen as sharing a common mission—albeit not yet fully synchronized—namely, leveraging GAI both to improve student learning and to enrich teaching practice. Within this framework, our study seeks to contribute to a deeper understanding of the needs and mutual interrelations surrounding GAI by examining expectations and uses through parallel, biunivocal measures from both the teacher and student perspectives.

3 Methodology

3.1 Research Design and Data Collection

For this study, two parallel questionnaires were administered—one for teachers and one for students—with identical items presented in both instruments (with only minimal communicative adjustments according to role). This design enabled direct comparison of data between the two groups. The full questionnaire is provided for review or replication (Appendix). The closed-ended items used a 5-point Likert scale, complemented by open-ended questions allowing free written responses. The questionnaires were developed by two researchers following a predefined outline aligned with the study objectives and were subsequently reviewed by two external experts (familiar with the teaching domain and the virtual platform in which the study was situated). This process allowed for progressive refinement of several items, particularly those addressing clarity in the formulation of personalization-related questions and the concreteness of examples concerning the generation of learning materials. The instruments were designed to capture both shared and differentiated perspectives on perceptions, usefulness, and situated uses of GAI, whether potential or actual. The questionnaires were structured into four content sections: (1) learning optimization, (2) management and organization of learning, (3) assessment of learning, and (4) creation of teaching–learning content. Finally, open-ended questions explored perceived advantages and disadvantages, suggestions for improvement, and additional purposes envisioned for GAI.

To facilitate interpretation of subsequent results, a concise overview of the questionnaire structure is provided here. The instrument comprised 11 closed-ended items organized into four analytical dimensions:

(1). Learning optimization, including items such as “provides real-time suggestions” and “personalizes learning according to level and type”;

(2). Management and organization of learning, with items like “performs intelligent searches for resources” and “plans solutions for unforeseen events”;

(3). Assessment and feedback, featuring items such as “detects errors in completed tasks” and “poses reflective questions about learning performance”;

(4). Content creation, with items referring to “generating new materials” or “adapting content to context.”

All items were rated on a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. In addition, four open-ended questions invited participants to describe (a) desired purposes or functionalities of GAI, (b) perceived advantages, (c) perceived disadvantages, and (d) suggestions for improvement. Full versions of both instruments (student and teacher) are included in the Appendix.

3.2 Data Sample

The study employed a purposive sample consisting of 235 students and 36 of their instructors from the Bachelor’s Degree in Graphic Design and the Master’s Program in Education and ICT. Both groups

completed the questionnaire at the same point in the academic term, responding to identical items (adapted to their respective roles in facilitating learning) and under the same time constraints and conditions.

Participation was voluntary and anonymous, ensuring that both student and teacher perspectives were equally represented in the comparative analysis.

3.3 Analysis Procedure

A Likert-scale questionnaire was applied for the comparative results, combined with a thematic aggregation procedure for the open-ended responses. Additionally, a subsequent integrative analysis was conducted to reinforce interpretation and to detect possible convergences or discrepancies between both approaches. Two complementary procedures were employed for data processing. First, a quantitative analysis of the Likert-scale responses was carried out, producing descriptive statistics by group, item, and dimension, as well as testing internal consistency using Cronbach's α. This approach provided a solid statistical basis for supporting claims about discrepancies in perceptions of GAI. Independent-samples t-tests were conducted to assess statistical significance between teachers and students. Differences with $p < .05$ were considered significant, and those with $p < .01$ were highly significant. This ensured robust quantitative evidence for the observed differences.

Second, a qualitative thematic analysis was conducted on the open-ended responses in order to identify usage patterns, emerging categories, and discursive nuances that complemented the numerical results. This qualitative process was entirely separate from the quantitative analysis and followed a structured coding procedure: two researchers independently reviewed all responses, created initial codes to later agree on four thematic categories—purposes, advantages, limitations, and suggestions—aligned with the study's objectives. A third expert reviewed and validated the final categorization to ensure interpretive consistency. The integration of both analyses not only confirmed differences in the evaluations of the two groups but also enabled interpretation of the underlying reasons and the contexts of use that account for such perceptions.

4 Results

Following data collection, both quantitative and qualitative analyses were conducted in an integrated manner. The quantitative results, derived from the closed-ended Likert-scale items, provide descriptive and inferential evidence of systematic differences between teachers and students. The qualitative results, based on open-ended responses, offer interpretive depth to explain those differences and reveal underlying perceptions, expectations, and experiences. Together, these complementary analyses illuminate not only what differences exist but also why they emerge within the context of online higher education.

4.1 Closed-Ended Results

The results from the closed-ended items provide a descriptive overview of how teachers and students evaluated the pedagogical relevance and perceived usefulness of Generative Artificial Intelligence (GAI) across the four analytical dimensions: learning optimization, management and organization, assessment and feedback, and content creation. These data reveal clear and consistent trends in the way both groups position themselves toward GAI in online higher education.

Across all dimensions, students reported systematically higher evaluations than teachers, with mean differences ranging from 0.52 to 0.83 points. Students expressed greater confidence in GAI's potential to optimize learning processes, manage information, and support feedback, whereas teachers maintained a more neutral stance that reflects caution and the need for pedagogical validation.

As shown in Table 1, students consistently rated all items higher than teachers, revealing a positive bias toward GAI functionalities that becomes clearer in the subsequent dimensional analysis.

Table 1 Comparison of Teachers' and Students' Responses to Closed-Ended Items

Question	Mean (Teachers)	SD (Teachers)	Mean (Students)	SD (Students)	Mean Difference
1	3.28	1.41	3.84	1.22	+0.56
2	3.28	1.37	3.83	1.18	+0.55
3	3.25	1.36	3.94	1.14	+0.69
4	3.06	1.31	3.94	1.17	+0.88
5	2.86	1.36	3.77	1.21	+0.91
6	3.17	1.50	3.90	1.18	+0.73
7	3.25	1.54	4.07	1.12	+0.82
8	3.44	1.54	3.89	1.12	+0.45
9	3.25	1.44	3.79	1.18	+0.54
10	3.31	1.51	3.83	1.27	+0.52
11	3.11	1.51	3.64	1.28	+0.53

By dimensions:

- Learning Optimization: Teachers (M = 3.24, SD = 1.25) — Students (M = 3.78, SD = 1.10). Students valued GAI's capacity to provide guidance and adaptive support, while teachers' responses suggest partial acceptance of its potential in this area.

- Management and Organization: Teachers (M = 3.06, SD = 1.19) — Students (M = 3.89, SD = 1.04). This dimension shows the largest gap (+0.83), with students perceiving GAI as a facilitator for structuring tasks and locating resources, in contrast to teachers' limited trust in its reliability for planning or problem solving.

- Assessment and Feedback: Teachers (M = 3.28, SD = 1.39) — Students (M = 3.91, SD = 1.01). Both groups acknowledged potential benefits for feedback and reflection, though teachers remained less confident about automated evaluation.

- Content Creation: Teachers (M = 3.21, SD = 1.43) — Students (M = 3.73, SD = 1.22). Teachers recognized GAI's usefulness in generating materials, but students assigned it greater creative and practical value.

Reliability analyses confirmed the internal consistency of the instrument across all dimensions (α > .85 for both groups), ensuring robust comparisons. Subsequent t-tests showed statistically significant differences ($p < .05$ to $p < .001$) in favor of students across all four dimensions, quantitatively confirming a systematic perception gap between both collectives.

4.1.1 Reliability of the results

Before interpreting the group comparisons, it was necessary to verify the internal consistency of the instrument. Cronbach's α coefficients were calculated for each of the four analytical dimensions and for the overall 11-item scale, separately for teachers and students. This procedure ensured that all items within each dimension measured the same underlying construct, providing a reliable basis for interpreting the observed mean differences. According to Nunnally and Bernstein (1994), values of α ≥ .70 are considered acceptable, α ≥ .80 good, and α ≥ .90 excellent. In the field of educational research, similar validation approaches have been applied to confirm the robustness of instruments measuring perceptions of and attitudes toward GAI (Zawacki-Richter et al., 2019).

Table 2 Reliability Coefficients (Cronbach's α) for Teachers and Students by Dimensions

Dimension	**Cronbach's *α* (Teachers)**	**Cronbach's *α* (Students)**
Optimization	0.885	0.914
Management	0.866	0.859
Evaluation	0.940	0.903
Creation	0.882	0.905
Overall (11 Items)	0.958	0.956

Note. Reliability calculated on 11 Likert-scale items.

All coefficients exceeded the 0.85 threshold, demonstrating excellent inter- nal consistency across the instrument. Particularly high values were obtained for the overall scales (α = 0.956 for students and α = 0.958 for teachers), confirming that the instrument consistently captures the intended constructs. These results provide a solid foundation for subsequent statistical comparisons between groups, presented in Section 4.2.

4.2 Quantitative Comparison between Teachers and Students

Building on the previously established reliability of the instrument, this section presents the quantitative comparison between teachers and students across the eleven closed-ended items. The analysis examines how both groups evaluated the pedagogical relevance and usefulness of Generative Artificial Intelligence (GAI) in online higher education, identifying systematic patterns of difference across the four analytical dimensions.

Overall, students rated all functionalities of GAI more positively (M ≈ 3.8– 4.0) than teachers (M ≈ 3.1), revealing a consistent perception gap between both collectives. This pattern is evident across every dimension: learning optimization, management and organization, assessment and feedback, and content creation, and is further confirmed through statistical testing reported below. The following subsections detail these differences by group, item, and dimension, highlighting both convergences and divergences in their evaluations.

4.2.1 Teachers' responses

The meanscores for items 1–11 show that teachers remained close to neutrality across all functionalities (≈ 3.1/5.0). This reflects a cautious stance and limited confidence in the applicability of GAI in educational contexts.

(1) Highest-rated aspects

- Item8–Suggestions for improvement (M = 3.44, SD = 1.54): the most positively evaluated function, suggesting some recognition of GAI's usefulness in supporting feedback processes.–

● Items 1 and 2– Learning optimization (M = 3.28, SD ≈ 1.4): also scored slightly above the neutral point, indicating partial acceptance of GAI as a tool to guide and personalize instruction.

(2) Lowest-rated aspects

- Item5–Planning for contingencies (M = 2.86, SD = 1.36): the lowest-rated item, highlighting distrust in GAI's reliability in dynamic or unpredictable situations.

● Item 4– Intelligent searches (M = 3.06, SD = 1.31): although still close to neutral, this reflects hesitancy to rely on GAI for resource discovery and search-related tasks.

4.2.2 Students' responses

By contrast, students rated all items more positively (≈ 3.8–4.0/5.0 overall), indicating clear expectations and confidence in GAI as an educational resource.

(1) Highest-rated aspects

● Item7–Error detection (M = 4.07, SD = 1.12): the strongest endorsement, reflecting strong confidence in GAI's capacity to support correction and quality control.

● Items 3 and 4– Management and intelligent searches (M = 3.94, SD ≈ 1.15): also highly valued, suggesting that students appreciate GAI's ability to streamline organizational and information-related tasks.

(2) Lowest-rated aspects

● Item 11– Reasoned decision-making (M = 3.64, SD = 1.28): although this is the lowest score among students, it still lies clearly on the positive side of the scale.

● Item 5– Planning for unforeseen events (M = 3.77, SD = 1.21): similarly, this item is among the lowest, yet remains notably higher than teachers' evaluation of the same item.

4.2.3 Teacher–Student comparison

(1) Similarities

● Both groups recognize the potential of applications related to feedback (items 8 and 9) and content creation (item 10), although with differing levels of enthusiasm.–

● Planning for unforeseen events (item 5) is consistently ranked among the lowest by both groups.

(2) Differences

● Magnitude of ratings: students consistently obtain higher scores, with mean differences ranging from +0.5 to +0.8 points across all items.

● Error detection and metacognitive tasks: students strongly endorse these functions (M ≥ 3.9), while teachers remain closer to neutrality (M ≈ 3.2).

● Overall perception: students display a predominantly favorable and confident outlook, whereas teachers' evaluations reflect uncertainty and caution.

4.2.4 Statistical group comparisons by t-test

Independent samples t-tests were conducted to compare mean responses between students and teachers. These tests determine whether differences between the groups are statistically significant. The majority of items and all dimensions showed significant differences, with students scoring consistently higher than teachers. This statistically confirms a systematic gap in perceptions. Values of $p < .05$ were considered statistically significant, and values of $p < .01$ were considered highly significant.

Table 3 T-test Results by Dimension

Dimension	Mstudents	Mteachers	t	p
Learning Optimization	3.78	3.24	2.46	0.018
Management	3.89	3.06	3.95	< 0.001
Evaluation	3.91	3.28	2.65	0.011
Content Creation	3.73	3.21	2.09	0.043

Note. Independent samples t-tests comparing students and teachers across aggregated dimensions.

Table 4 T-test results per item

Item	M-students	M-teachers	t	p
1 Learning Optimization: Suggestions	3.84	3.28	2.26	0.029
2 Learning Optimization: Personalized Learning	3.83	3.28	2.32	0.025
3 Management and Organization: Manages	3.94	3.25	2.89	0.006
4 Management and Organization: Performs	3.94	3.06	3.83	< 0.001
5 Management and Organization: Plans	3.77	2.86	3.82	< 0.001
6 Evaluation and Feedback: Reviews	3.90	3.17	2.81	0.008
7 Evaluation and Feedback: Gives Feedback	4.07	3.25	3.09	0.004
8 Evaluation and Feedback: Monitors	3.89	3.44	1.68	0.100
9 Evaluation and Feedback: Provides Feedback	3.79	3.25	2.15	0.038
10 Content Creation: Creates Content	3.83	3.31	1.96	0.056
11 Content Creation: Adapts Content	3.64	3.11	1.99	0.053

Note. Independent samples t-tests comparing students and teachers across individual items.

4.3 Open-Ended Results

The open-ended responses complement the quantitative findings by provid- ing deeper insight into how teachers and students perceive and experience Generative Artificial Intelligence (GAI) in online higher education. Thematic analysis identified four overarching categories—purposes, advantages, limitations, and suggestions—which collectively capture the range of attitudes and expectations expressed by participants. These qualitative results illuminate the nuances behind the numerical differences observed in the previous section, allowing a more contextual understanding of how each group positions itself toward GAI.

4.3.1 Descriptive Findings: Teachers and Students

Teachers' responses primarily emphasized practical and organizational aspects of GAI use. They valued the technology for its potential to automate technical or repetitive tasks, such as detecting errors, synthesizing information, or preparing structured materials. Their discourse often reflected cautious optimism—acknowledging the potential of GAI to streamline workflow while simultaneously expressing concerns about reliability, ethical boundaries, and pedagogical coherence. Teachers highlighted the need for training, validation, and contextual adaptation before full integration could be considered.

Students, on the other hand, expressed a broader and more enthusiastic view of GAI. They highlighted its creative and motivational potential, describing it as a versatile tool for generating ideas, simplifying complex concepts, and enhancing engagement with learning materials. Many participants emphasized efficiency and immediacy, noting how GAI accelerates writing and research processes. However, some students also mentioned risks such as dependence, reduced critical thinking, and superficial learning, showing partial awareness of the challenges inherent in everyday use.

Overall, teachers' responses conveyed a professional-instrumental perspective—centered on accuracy, control, and pedagogical integrity—whereas students' narratives projected a creative-experiential orientation, grounded in experimentation and personal usefulness.

4.3.2 Comparison between teachers and students

A cross-group comparison reveals both points of convergence and notable di- vergences.

Both teachers and students identified GAI's capacity to enhance feedback processes and support material creation as its most promising educational applications. This shared recognition aligns with the quantitative findings, where both groups rated these dimensions among the highest.

However, deeper interpretive contrasts emerged.

- Teachers tended to perceive GAI as a complementary, assistive instrument, requiring careful regulation to maintain pedagogical rigor and ethical standards.

- Students, by contrast, saw it as an empowering, exploratory tool, central to creativity and self-regulated learning.

While teachers emphasized control and professional responsibility, students valued autonomy, immediacy, and innovation. These perspectives reveal different epistemic relationships with the technology: one anchored in institutional accountability, the other in personal utility and experimentation.

Despite these differences, the open-ended data also point toward potential convergence zones—particularly in feedback enhancement and adaptive learning support—suggesting shared ground for future pedagogical co-design. This duality of agreement and contrast mirrors the quantitative perception gap and underscores the importance of developing strategies that harmonize both standpoints within evidence-based frameworks for GAI integration.

Together, these qualitative insights echo the quantitative results and set the stage for the integrated interpretation discussed below.

4.4 Integrated Interpretation

The integration of complementary quantitative and qualitative findings provides a more comprehensive understanding of how teachers and students position themselves with respect to Generative Artificial Intelligence (GAI) in online higher education. Quantitative analyses revealed systematic and statistically significant differences across all dimensions, with students consistently rating GAI functionalities more positively than teachers. The qualitative insights explain these divergences in attitudinal and experiential terms: while students associate GAI with immediacy, creativity, and efficiency, teachers approach it through a more instrumental and cautious lens, emphasizing issues of reliability, control, and pedagogical coherence.

Taken together, these complementary strands of evidence suggest that the observed gap is not merely a matter of enthusiasm but reflects distinct underlying frameworks of interaction with technology. Students' engagement appears to be driven by practical convenience and exploration, whereas teachers' adoption is mediated by concerns related to professional responsibility and instructional design. The data also indicate shared awareness of GAI's potential to enhance feedback and content creation, which could serve as a point of convergence for progressive integration.

By interpreting both perspectives within a single analytical frame, the results highlight that meaningful implementation of GAI requires bridging epistemic and procedural differences between students and teachers. Rather than representing opposing views, these differences underscore a necessary dialogue between immediacy and reflection, innovation and control—dimensions that, when aligned, may sustain a balanced and pedagogically coherent incorporation of GAI into digital learning environments.

Altogether, these integrated insights provide the basis for a deeper interpretation of how such divergent perceptions influence educational practice, a question further explored in the following Discussion section.

5 Discussion

The findings of this study provide insight into the differing perceptions and expectations that students and teachers hold regarding the integration of Generative Artificial Intelligence (GAI) in digital educational environments. Taken together, the quantitative and qualitative results reveal a clear, statistically significant, and conceptually consistent gap between both groups.

The quantitative data show a systematic pattern: while students consistently evaluate GAI functionalities positively, teachers tend to remain closer to a neutral stance. This difference is not anecdotal but reflects a structural divergence in how GAI is conceptualized within the teaching–learning pro- cess. In line with recent authors such as Chan and Hu (2023) and Slimi et al. (2025), students associate GAI with increased personalization, creativity, and metacognitive support, resulting in positive expectations of immediate impact. By contrast, teachers express caution toward functions such as personalized learning or contingency planning, where lower scores suggest doubts about reliability, pedagogical relevance, and contextual alignment.

These perceptions echo the findings of Al-Ali and Miles (2025), who stress the importance of providing teachers with situated and personalized training for effective integration of GAI in higher education, and of Roe et al. (2024), who highlight the need for teacher support so that GAI is not perceived as a threat to professional autonomy but rather as a complementary pedagogical tool. Regarding the student community, as also noted by Ghimire et al. (2024), learners tend to regard GAI as a driver of innovation and as a means to simplify the educational experience.

The qualitative analysis reinforces this interpretation. Students not only view GAI as a facilitator but also propose concrete suggestions for its integration—from incorporating systems similar to Copilot or ChatGPT to improve material design and organization, to using it for immediate feedback or streamlined submission processes. In contrast, teachers' comments were more specific and instrumental (e.g., spell-checking, general overviews of a topic), revealing a degree of pragmatic restraint that aligns with Wu et al. (2024), who describe an early stage of appropriation of GAI within the teaching community, one that still requires awareness-raising and targeted training initiatives.

The convergence of both analyses strengthens the conclusion that enthusiasm and frequency of use are higher among students, while teachers' engagement depends largely on perceived pedagogical control, reliability, and professional alignment. The results suggest that whereas students project their expectations toward immediate and transformative applications, teachers demonstrate a need for assurances regarding quality and for situated training to support pedagogical integration.

However, identifying the root causes of this difference in pace and enthusiasm goes beyond the scope of this study, since it compared parallel task development rather than intrinsic roles or conceptual frameworks. Attributing the divergence to ideological or generational factors would be speculative; instead, it likely reflects differences in prior exposure and experience with GAI technologies (Ardelean & Edit, 2023).

Based on these findings, the discussion points to two necessary directions. The first involves designing progressive integration strategies that start with functions showing greater acceptance, such as metacognitive support and material generation, and gradually extend to more complex scenarios like personalization and contingency management. The second direction focuses on providing evidence-based, context-sensitive teacher training grounded in real classroom cases, aimed at fostering critical appropriation and trust in the technology. In this way, the identified gap could be progressively narrowed, encouraging a balanced and pedagogically sound use of GAI in environments such as the one studied.

6 Conclusions

This study has highlighted a systematic gap between the perceptions of students and teachers regarding the integration of Generative Artificial Intelligence (GAI) in online teaching and learning environments. Across all items and dimensions, students evaluated GAI functionalities with clearly positive ratings, while teachers remained closer to neutrality, reflecting a more cautious and expectant attitude.

The results reveal areas of consensus—particularly around support for reflection and material creation—that may serve as starting points for gradual integration processes. However, more complex functions such as personalized learning or contingency planning continue to generate hesitation among teachers, emphasizing the importance of confidence-building and evidence-based adoption.

From a psychopedagogical perspective, these divergent collective “images” directly influence the potential transformative role of GAI in teaching and learning interactions. Making these contrasts visible allows educators and institutions to design intervention strategies that explicitly engage with both perspectives under equal analytical conditions. In this way, the study provides actionable insights to guide the critical and evidence-based integration of GAI in higher education, balancing innovation with teacher trust, and addressing both the risks and the potential that this technology poses for teachers and students in digital environments.

6.1 Recommendations

Based on these findings, three complementary lines of action are proposed:

1. Progressive integration of GAI. Implementation should begin with areas of greater shared acceptance—such as metacognitive support and material creation—and gradually move toward more complex or sensitive functions, including personalization and contingency planning. A phased

approach helps generate positive early experiences, validate pedagogical impact, and reduce resistance to adoption.
2. Situated teacher training. Professional development initiatives must go beyond technical instruction to include real case studies and empirical evidence of pedagogical benefits. Training should emphasize critical understanding, contextual application, and opportunities for collaborative experimentation with GAI tools.
3. Co-design with students. Students' contributions reflect practical insight into how GAI can meaningfully enhance learning. Integrating their proposals through participatory design practices can bridge the perception gap with teachers, aligning innovation with pedagogical coherence and shared ownership of technological change.

The analysis shows that students not only evaluate GAI more positively across all items but also put forward concrete and creative proposals in their open-ended responses. This proactive disposition positions students as valuable partners in shaping future teaching–learning processes. Incorporating their perspectives, while maintaining teacher-led pedagogical framing, can lead to a balanced and sustainable model of AI-enhanced education.

Declarations

Author Contribution

I.B.A. and E.B.G. conceived and designed the study, developed the research instruments, and led the writing of the manuscript. I.B.A. coordinated data collection and conducted the quantitative analysis. A.N. contributed to the statistical analysis and the interpretation of quantitative results. K.L. provided critical review of the theoretical framework and the discussion of findings. E.B.G. supervised the overall research process. All authors reviewed and approved the final version of the manuscript.

Data Availability

Funding Statement:This research was supported by the Spanish Ministry of Science, Innovation, and Universities [grant number PRX23/00482].Data Availability Statement:The data that support the findings of this study consist of survey responses collected from students and teachers under informed consent. The data are not publicly available due to privacy and confidentiality restrictions. The anonymised dataset is held by the authors and may be made available upon reasonable request and subject to the approval of all participating institutions.

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