From Traditional Teaching to Smart Classrooms: Can AI Replace Teachers?

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ABSTRACT

This study aimed to analyze students' and teachers' perceptions of the possibilities and limitations of generative AI for supporting or replacing specific teaching functions, based on a literature review and responses from participants in the Department of Computer Systems at the Instituto Tecnológico de Pachuca. A mixed-methods, non-experimental, cross-sectional, exploratory, and descriptive design was used. The reported sample comprised 93 students and 16 faculty members selected through non-probability convenience sampling. Information was collected using two questionnaires containing categorical questions, rating scales, and open-ended questions. In the reported results, intermediate self-perceived experience was the most common category in both groups. Students most often mentioned explaining complex topics and summarizing texts, while faculty highlighted instructional-material design and assessment preparation. Reported scores for soft skills and critical thinking were lower than those for other teaching functions. Open-ended responses were organized into three themes: tutorial assistance, task optimization, and responsible use. The findings describe the perceptions of this sample and do not establish that AI can replace teachers as a whole.

Keywords: artificial intelligence, higher education, teachers, learning, digital ethics.

INTRODUCTION

Are We Educating Students Who Can Think or Users Who Can Obtain Answers? In an era when artificial intelligence can solve problems, write essays, and explain concepts in seconds, an inevitable question arises: are we using technology to learn, or are we learning to depend on it?

Education has greatly benefited from the ability of intelligent tools to personalize learning, facilitate access to information, and optimize certain teaching activities. Their widespread implementation makes it possible to tailor explanations to students' needs, generate personalized exercises, and provide immediate feedback (UNESCO, 2026). However, their integration also poses challenges related to information reliability, algorithmic bias, data privacy, and the risk of promoting superficial learning (UNESCO, 2026). In this context, who controls the learning process: the student, the teacher, or artificial intelligence?

The problem arises when students transfer their intellectual responsibilities to technology. They may receive a summary, submit an assignment, and complete a task without having developed meaningful knowledge (UNESCO, 2026). When teachers no longer fully fulfill their role as guides in the development of critical thinking, allowing artificial intelligence to occupy a central position in the educational process, knowledge gaps may emerge. This can also make it difficult to identify assignments containing inconsistencies, poorly supported arguments, or a limited understanding of the subject. Thus, the problem lies not only in what artificial intelligence is capable of doing, but also in what human beings fail to develop when they delegate their own abilities to it (Santillán, 2025). Therefore, AI should serve as a starting point for research, information verification, and reflection, rather than as a substitute for independent reasoning. In this process, teachers play an essential role by designing activities that promote critical thinking, guiding students toward reliable sources, and establishing clear criteria for the use of these tools.

Ultimately, students should be the protagonists of their own learning, teachers should serve as their guides, and artificial intelligence should remain a complementary resource. The question is not who has more answers, but who develops the ability to understand, question, and use them responsibly.

LITERATURE REVIEW

PRISMA 2020 Approach

A literature review was conducted following the PRISMA 2020 guidelines to identify studies on the use of generative artificial intelligence in higher education, particularly regarding its potential to support or replace teaching functions. Searches were performed in Scopus, Google Scholar, ScienceDirect, Springer, and MDPI for the period 2020–2026.

Keywords included: "generative AI in education," "ChatGPT teachers," "AI replace teachers," "student perceptions AI education," "AI teaching functions," and "critical thinking AI higher education." Priority was given to empirical studies, systematic reviews, and peer-reviewed articles that addressed perceptions, applications, limitations, or ethical aspects of generative AI in teaching and learning. After screening, 20 studies were selected for analysis.

Table 1. Literature Review Analysis

#	Author(s) and Year	Title	Source	Key Findings	Relation to the Study
1	Kasneci et al. (2023)	ChatGPT for good? On opportunities and challenges of large language models for education	Learning and Individual Differences	Identifies opportunities and risks of LLMs; emphasizes the need for AI literacy and human supervision.	Supports the analysis of verification practices and responsible use.
2	Miao & Holmes (2023)	Guidance for generative AI in education and research	UNESCO	Provides recommendations on ethics, data protection, and human-centered approaches.	Contextualizes ethical considerations and the role of teachers.
3	Miao & Cukurova (2024)	AI competency framework for teachers	UNESCO	Proposes a competency framework focused on human-centered AI integration in teaching.	Reinforces that AI should complement rather than replace teachers.
4	Almasri (2024)	Exploring the impact of artificial intelligence in teaching and learning of science	Research in Science Education	Systematic review showing benefits and challenges of AI in science education.	Supports findings on both utility and concerns about learning quality.
5	Ogunleye et al. (2024)	A systematic review of generative AI for teaching and learning practice	Education Sciences	Identifies applications in content generation and challenges related to academic integrity.	Aligns with teachers' use for material design and assessment.

6	Yusuf et al. (2024)	Generative AI in education and research: A systematic mapping review	Review of Education	Maps current research trends on generative AI in education.	Provides broader context for the perceptions analyzed.
7	Baidoo-Anu & Ansah (2023)	Education in the era of generative artificial intelligence	Journal of AI	Discusses benefits and risks of ChatGPT in educational settings.	Supports the distinction between support and substitution.
8	Chan & Hu (2023)	Students' voices on generative AI	International Journal of Educational Technology	Students perceive AI as useful for learning but express concerns about over-reliance.	Aligns with student responses on tutorial assistance and cognitive effort.
9	Cotton et al. (2024)	Chatting and cheating: Ensuring academic integrity in the era of ChatGPT	Innovations in Education and Teaching International	Highlights risks to academic integrity and the need for clear guidelines.	Related to concerns about responsible use and task completion.
10	Farrokhnia et al. (2024)	A SWOT analysis of ChatGPT	Innovations in Education and Teaching International	Identifies strengths, weaknesses, opportunities, and threats of ChatGPT in education.	Supports the balanced view of benefits and limitations.
11	Holmes et al. (2022)	Ethics of AI in education	International Journal of Artificial Intelligence in Education	Emphasizes ethical principles and the irreplaceable role of teachers in certain functions.	Reinforces low scores for soft skills and critical thinking.
12	Lim et al. (2023)	Generative AI and the future of education	Computers and Education: Artificial Intelligence	Discusses transformation of teaching practices and the need for teacher adaptation.	Contextualizes the different uses reported by students and teachers.
13	Mollick & Mollick (2023)	Assigning AI: Seven approaches for students	SSRN	Proposes structured ways to integrate AI while maintaining student agency.	Supports the idea of AI as a complementary tool.
14	Rudolph et al. (2023)	ChatGPT: Bullshit spewer or the end of traditional assessments	Journal of Applied Learning & Teaching	Questions the validity of traditional assessments in the presence of generative AI.	Related to teachers' use of AI for assessment preparation.

15	Tlili et al. (2023)	What if the devil is my guardian angel	Smart Learning Environments	Explores student perceptions and ethical concerns regarding ChatGPT.	Aligns with open-ended responses on responsible use.
16	Zawacki-Richter et al. (2019)	Systematic review of research on AI applications in higher education	International Journal of Educational Technology in Higher Education	Foundational review on AI applications; updated relevance with generative AI.	Provides historical context for current generative AI studies.
17	Chan (2023)	A comprehensive AI policy education framework	Computers and Education: Artificial Intelligence	Emphasizes the need for institutional policies on AI use.	Supports the call for responsible integration.
18	Lo (2023)	What is the impact of ChatGPT on education?	Education Sciences	Reviews early evidence on ChatGPT's effects on teaching and learning.	Complements the perception data of the present study.
19	Perkins (2023)	Academic integrity considerations of AI large language models	Journal of University Teaching & Learning Practice	Discusses implications for academic integrity and assessment design.	Related to concerns about cognitive effort and task completion.
20	Su & Yang (2023)	Unlocking the power of ChatGPT	Education and Information Technologies	Explores opportunities and challenges of ChatGPT for teachers and students.	Supports the differentiated uses observed between both groups.

The reviewed literature indicates that generative AI is widely perceived as a useful support tool for specific teaching and learning tasks, particularly content explanation, material design, and administrative optimization. However, most studies caution against viewing AI as a substitute for teachers, especially in functions related to critical thinking, ethical judgment, personal guidance, and the development of soft skills. These findings are consistent with the perceptions reported in the present study.

METHODOLOGY

The study adopted a mixed-methods, non-experimental, cross-sectional, exploratory, and descriptive design. The quantitative component analyzed categorical responses and rating-scale scores, while the qualitative component examined open-ended responses. No variables were manipulated, and data were collected at a single point in time.

A narrative literature review was conducted to contextualize the applications, benefits, limitations, and ethical considerations of generative AI in education. The review was not systematic, as a full PRISMA protocol with predefined inclusion/exclusion criteria and a complete search log was not documented.

The population of interest consisted of students and faculty members from the Department of Computer Systems at the Instituto Tecnológico de Pachuca. A non-probability convenience sample of 109 participants was obtained (93 students and 16 teachers). Results are limited to this sample and cannot be generalized to the entire institution or to other universities.

Two questionnaires were administered, one for students and one for teachers. Each instrument contained 14 items, including categorical questions, 5-point rating scales, and one open-ended question. The questionnaires collected data on self-perceived experience, frequency of use, main educational applications, confidence in AI-generated information, verification practices, and perceptions regarding the substitutability of six teaching functions. Data collection took place on October 26, 2026. Informed consent was included in the questionnaires, with guarantees of confidentiality and anonymity.

Frequencies and percentages were calculated for categorical variables. Arithmetic means were computed for the rating-scale items related to confidence, verification, and the six teaching functions. Open-ended responses were reviewed and organized into three thematic categories: tutorial assistance, task optimization, and responsible/restricted use. The analysis was descriptive; no causal relationships were established, and no inter-coder reliability procedure was applied to the qualitative data.

RESULTS

Profile and Patterns of Artificial Intelligence Use

The self-reported intermediate level of experience was the most frequent category in both groups: 52.7% of students (49 out of 93) and 50.0% of teachers (8 out of 16). Among students, 40.9% identified themselves as beginners, 3.2% as advanced users, and 3.2% reported having no experience. Among teachers, 31.2% identified themselves as beginners and 18.8% as advanced users. Regarding frequency of use, 38.7% of students reported using AI once or twice a week, 33.3% three to four times a week, and 26.9% five or more times a week; one student reported not using it. Among teachers, 62.5% reported using it once or twice a week, 31.2% five or more times a week, and 6.2% three to four times a week.

The most frequently mentioned applications varied by group. Among students, there were 75 mentions of explaining complex topics, 34 of summarizing texts, 33 of generating or correcting code, and 30 of searching for references. Among teachers, there were 15 mentions of designing instructional materials, seven of creating assessments, five of searching for references, and five of lesson planning. These data represent responses to a question that allowed participants to select their two main activities, rather than mutually exclusive categories.

Trust and Information Verification

For the numerical items recorded on a scale from 1 to 5, the mean score for trust in the accuracy and reliability of AI-generated information was 2.92 among students and 2.88 among teachers. For the item concerning thorough verification of information before using it, the mean scores were 3.40 among students and 3.81 among teachers. The Excel dataset does not include the labels for the endpoints of the scale; therefore, the observed means are reported without assigning verbal categories such as “neutral” or “high.”

In both groups, the mean score for the verification item was higher than that for the trust item. This difference describes the recorded responses but does not, by itself, demonstrate that all participants systematically verify information. The interpretation must take into account that these are self-reported responses and that the exported file does not preserve the complete scale labels.

Perceptions of the Replacement of Teaching Functions

The mean scores for the six items concerning the possible replacement of teaching functions were calculated using the responses recorded in the Excel spreadsheets. Among students, the mean scores were 2.70 for explaining theory; 2.67 for answering questions or providing guidance; 2.68 for assessment and feedback; 2.24 for personal guidance and support; 2.02 for developing critical thinking; and 2.00 for developing soft skills. Among teachers, the respective mean scores were 2.81, 2.56, 2.44, 2.25, 2.00, and 1.81.

In both groups, the lowest mean scores corresponded to the development of soft skills and critical thinking, whereas the highest scores were recorded for explaining theory, answering questions, and assessment and feedback. Since the response file does not preserve the labels for the endpoints of the scale, these differences

are presented as numerical means and are not interpreted as definitive levels of acceptance or rejection of teacher replacement.

Table 2. Reported mean scores for teaching functions

Teaching Function	Students	Teachers
Explaining Theory	2,70	2,81
Answering Questions or Providing Guidance	2,67	2,56
Assessment and Feedback	2,68	2,44
Personal Guidance and Support	2,24	2,25
Development of Critical Thinking	2,02	2,00
Development of Soft Skills	2,00	1,81

Source: Own elaboration based on responses to surveys administered to students and teachers on October 26, 2026.

Qualitative Analysis of Open-Ended Responses

The open-ended responses were organized into three thematic categories. The first, referred to as tutoring assistance, brought together students' responses describing AI as a tool for searching for information, understanding topics, and resolving questions outside class hours. The second, administrative optimization, grouped teachers' opinions regarding the usefulness of AI in streamlining repetitive tasks, preparing instructional materials, and creating assessments, with the expectation of dedicating more time to student guidance.

The third category, analytical and restrictive use, included responses from both groups that emphasized the need to establish boundaries. Among students, concerns were raised about completing entire assignments using AI and reducing cognitive effort. Among teachers, the emphasis was on the need for the tool to function as a complement rather than as a substitute for ethical judgment or for learning the fundamental principles of their respective disciplines.

DISCUSSION

The results reveal a functional distribution of artificial intelligence (AI) use within the educational context studied: students primarily rely on these tools to understand content and summarize texts, whereas teachers mainly use them to design instructional materials and prepare assessments. This difference is not merely a variation in preferences; rather, it points to two distinct ways of incorporating AI into academic work. For students, the tool is closely associated with the immediate process of comprehension, while for teachers, it is integrated into the preparation of resources and the organization of pedagogical tasks. This pattern is consistent with research documenting applications of generative AI in both learning support and the development of educational resources, as well as the optimization of teaching activities (Ogunleye et al., 2024; Yusuf et al., 2024). Nevertheless, the scope of these findings must be clearly defined: the data describe practices reported by participants at this institution and do not allow these priorities to be generalized to other university contexts.

The difference in usage frequency raises a question that deserves further attention: using AI regularly does not necessarily mean knowing how to use it effectively. Frequency may reflect familiarity, availability, or convenience, but it does not, by itself, demonstrate digital competence, the quality of interactions, or the ability to critically evaluate generated responses. Therefore, it would be premature to interpret more frequent use as evidence of more advanced educational integration. Establishing such a relationship would require data on specific purposes of use, prompt formulation strategies, verification procedures, and the criteria students and teachers use to assess the usefulness of the responses. This distinction is significant: the educational value of a tool depends not only on how often it is used, but also on how it contributes to reasoning, decision-making, and knowledge construction.

This caution is particularly relevant when examining the trust and verification scores. In both groups, the mean score for the verification item was higher than that for the trust item: 3.40 versus 2.92 among students and 3.81 versus 2.88 among teachers. This contrast describes a difference between self-reported responses, but it does not establish that verification always occurs or that it is carried out comprehensively. Kasneci et al. (2023) emphasize the importance of AI literacy, fact-checking, and human oversight. The challenge is to promote concrete practices involving source comparison, error identification, and recognition of the limitations of generative systems.

The question of replacing teaching functions requires an equally rigorous interpretation. The lowest mean scores corresponded to the development of soft skills and critical thinking, whereas the highest were observed for explaining theory, answering questions, and providing assessment and feedback. Since the survey export does not preserve the labels for the endpoints of the scale, this pattern should be described numerically rather than interpreted as definitive acceptance or rejection of teacher replacement.

If the scale was designed so that higher values represented greater agreement with the possibility of replacement, this pattern would suggest that participants consider these functions less replaceable than other educational tasks. However, because the original questionnaire is unavailable, the exact direction of the replacement scale cannot be established here. Therefore, the means are described without asserting that a higher score necessarily represents greater acceptance of replacement. Even with this limitation, the results highlight a central distinction: transmitting information, answering questions, or producing materials is not equivalent to assuming the full scope of the teaching role. Teaching also involves supporting learning processes, interpreting individual needs, contextualizing knowledge, and exercising pedagogical judgment in situations that cannot be resolved through standardized responses.

This distinction challenges a common assumption in debates about educational automation: that if a tool can perform certain teaching tasks, it can therefore replace teachers as educational agents. The ability to automate an activity does not demonstrate the ability to replace the entire set of functions within which that activity operates. Furthermore, within the framework of this study, the scores do not constitute an objective assessment of what AI can or cannot do; rather, they express participants' responses to specific teaching functions. The available evidence allows an analysis of perceptions regarding the replaceability of these functions, but it does not establish the actual capacity of AI systems to replace teaching work or the consequences such replacement might have for learning.

UNESCO's AI Competency Framework for Teachers provides a relevant perspective for interpreting this issue. Its emphasis on a human-centered approach, ethics, AI applications, pedagogy, and professional learning places technological integration within a broader educational vision (Miao & Cukurova, 2024). From this perspective, incorporating AI does not mean automatically displacing teachers' involvement; rather, it means strengthening teachers' ability to select tools, evaluate their results, and determine when their use is pedagogically appropriate. Similarly, UNESCO's guidance on generative AI emphasizes data protection, equity, and the need to maintain a human-centered approach when adopting these technologies (Miao & Holmes, 2023). Both perspectives shift the discussion away from a simplistic opposition between humans and machines toward a more productive question: under what conditions can AI contribute to rigorous, equitable, and learning-centered education?

The open-ended responses reinforce this tension between usefulness and caution. Students identified rapid access to explanations as an advantage, while teachers pointed to opportunities to reduce operational tasks. At the same time, concerns emerged regarding technological dependence, reduced cognitive effort, and the need to preserve critical thinking. These observations suggest that the practical assessment of AI does not eliminate concerns about learning quality; rather, both coexist within the reported perceptions. This coexistence matters because a tool may facilitate an immediate task without guaranteeing that students understand, retain, or can independently apply what they have learned. Reviews by Almasri (2024) and Ogunleye et al. (2024) likewise identify potential benefits of generative AI alongside challenges related to accuracy, academic integrity, bias, and the evaluation of educational effectiveness. Consequently, speed and convenience should be understood as operational advantages, not as sufficient evidence of pedagogical improvement.

The open-ended responses nevertheless have an exploratory scope. The identified themes make it possible to recognize recurring concerns and uses, but they should not be interpreted as formally validated categories or as estimates of prevalence, since an independent coding procedure was not documented. Future research could analyze these responses using an explicit coding protocol, with defined criteria and an assessment of inter-rater agreement. It would also be relevant to compare reported perceptions with performance evidence, including the quality of assignments, response accuracy, autonomy in problem-solving, and learning progress. Combining these forms of evidence would make it possible to distinguish more clearly between perceived usefulness, actual use, and educational outcomes.

The study's limitations include the non-probability nature of the sample, its concentration within a single institutional context, its reliance on self-reported responses, and the absence of an independent coding procedure for the open-ended responses. Although the spreadsheets allow the frequencies, percentages, and means reported in this article to be recalculated, they do not contain the complete labels for the endpoints of the scales or detailed documentation of the participant selection process. These limitations define the scope of the possible inferences and discourage turning local trends into general claims.

Overall, the results do not resolve whether artificial intelligence can replace teachers; instead, they demonstrate why this question cannot be answered solely through usage frequency, perceived usefulness, or the automation of isolated tasks. The evidence collected points to differentiated AI adoption among students and teachers, accompanied by practical expectations and concerns about dependence, verification, and

CONCLUSIONS

The objective of the study was to analyze students' and teachers' perceptions of the possibilities and limitations of generative AI in supporting or replacing certain teaching functions. Responses from 93 students and 16 teachers show that the self-reported intermediate level of experience was the most frequent category in both groups. Students primarily mentioned explaining complex topics, while teachers emphasized the design of instructional materials. The mean score for the verification item was higher than that for the trust item in both groups: 3.40 versus 2.92 among students and 3.81 versus 2.88 among teachers.

Across the six teaching functions assessed, the lowest mean scores corresponded to the development of soft skills and critical thinking. However, since the survey exports do not include the labels for the endpoints of the scale, the results should be interpreted as numerical scores rather than as conclusive evidence of the actual possibility of replacing teachers. The open-ended responses indicate that AI is considered useful as a tutoring aid and for streamlining tasks, although concerns were also expressed regarding technological dependence and the loss of individual effort.

The open-ended responses were organized into three perspectives: AI as a tutoring aid for students, as a tool for optimizing teaching tasks, and as a technology whose use requires clear boundaries. Overall, the reported responses reflect a positive assessment of AI as a support tool for certain educational activities, along with reservations about its use without supervision. The data describe the perceptions of the individuals surveyed; they do not demonstrate that AI can fully replace teachers.

Given the exploratory and descriptive scope of the study, the findings are limited to the perceptions of the 109 respondents and should not be generalized to other populations. The response sheets made it possible to recalculate frequencies, percentages, and means. However, they do not document the participant selection procedure in detail, do not preserve the labels for the endpoints of the scales, and do not include an independent coding protocol for the open-ended responses. Consequently, the study describes uses and perceptions that favor a complementary role for AI, but it does not establish that teaching functions can be entirely replaced.

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