Imaginaries of the Cultural Impact of GPT Usage in Pedagogical Practice

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Abstract

This research examines the cultural impact of artificial intelligence (AI)-based technologies, specifically GPT (Generative Pre-trained Transformer), on the pedagogical practices of master's level educators in Colombia. The study focuses on how AI influences the adaptation of teaching methods, interactions between teachers and students, and educational assessment, interpreted through Clifford Geertz's concept of culture. We identified three critical dimensions through Principal Component Analysis (PCA) of 18 Likert-scale statements: (1) AI as an integral part of contemporary teaching, with teachers perceiving GPT as a pedagogical facilitator that both respects and enriches cultural norms; (2) AI as an element complicating the educational act, revealing tensions in its integration with cultural expectations; and (3) AI independent of cultural interactions, where GPT does not significantly alter pedagogical dynamics. The study concludes that while GPT offers benefits such as the personalization and cultural enrichment of teaching, its implementation presents challenges in adapting to diverse educational contexts. These findings emphasize the need for a contextualized and careful approach to using AI in education to maximize its positive impact while mitigating potential cultural barriers.

Keywords: Artificial Intelligence, GPT, pedagogy, culture, assessment, teaching, principal component analysis.

1. Introduction

The research proposal explores how GPT-based technologies (Generative Pre-trained Transformer) influence the pedagogical practices of teachers pursuing a master's degree in education. The notion of culture proposed by Clifford Geertz (2005) is incorporated to enrich this analysis. This notion defines culture as a system of shared meanings interpreted through symbols that provide a structure for social action. From this perspective, the research examines changes in pedagogical practice and how these changes are understood and culturally contextualized within the educational environment.

Modification of Teaching Strategies

This category addresses how GPT has led teachers to modify their teaching strategies, considering how these transformations reflect and affect cultural meanings within the classroom. It investigates whether incorporating GPT generates new symbolic forms of teaching, redefining the teacher's role and cultural expectations around learning.

The integration of technologies such as GPT in the classroom has generated a significant cultural impact, transforming the traditional dynamics of teaching and learning. According to McLuhan and Lewis H. (1994), every technological medium introduces a new environment that shapes practices and the cultural meanings associated with those practices. In this sense, GPT and other artificial intelligence act as educational tools and reconfigure the pedagogical space, altering how teachers and students interact and build knowledge. This technological transformation leads to a reevaluation of the teacher's role, shifting from being the central source of knowledge to a facilitator who must mediate between students and the advanced capabilities of the technology (Selwyn, 2022).

Furthermore, incorporating artificial intelligence in education redefines cultural expectations around learning. Buckingham (2008) argues that educational technology introduces new forms of symbolism in the classroom, as these tools shape the cultural value of knowledge through access and immediacy. This shift may result in an educational culture prioritizing quick, efficient information over deep and critical understanding, thus altering the cultural norms and expectations of learning in the digital age (Williamson, 2017). From Geertz's (1973) perspective, teaching and learning are not merely technical processes but also cultural acts filled with symbolic meanings. Thus, integrating GPT introduces new symbols and practices that transform the existing pedagogical culture, redefining what it means to be a "good" teacher or a "good" student. Therefore, the use of GPT not only modifies pedagogical practices but also profoundly affects cultural meanings, creating new forms of symbolic interaction and learning.

Teacher-Student Interaction

This category examines how GPT affects the interaction between teachers and students, viewed through a cultural lens. Classroom interaction is not only about technical communication but also about the construction and exchange of shared meanings. The study investigates how the introduction of GPT as a mediator in communication can alter these symbolic and cultural dynamics.

Incorporating artificial intelligence tools like ChatGPT in education has significantly impacted teaching-learning dynamics and the traditional roles of teachers and students. González-González (2023) notes that "artificial intelligence has emerged as a disruptive technology in the field of education" (p. 52), emphasizing how these tools are profoundly altering the educational process. ChatGPT's ability to personalize learning and provide adaptive feedback reflects this transformation, enabling teachers to design "more effective and adaptive teaching activities for students" (González-González, 2023, p. 57).. However, as Apaza Calsin et al. (2023) warns, "integrating AI tools into education requires a deep understanding of their capabilities and limitations" (p. 97), highlighting the need for a careful approach to avoid excessive technological

dependence, which could limit the development of critical skills. In this context, Atencio-González et al. (2023) emphasize that "the prominence of ChatGPT in education lies in its potential to individualize learning" (p. 23), which can substantially modify how students interact with knowledge and with their teachers.

Nevertheless, educators face ethical challenges and risks when implementing ChatGPT in education. González-González (2023) emphasizes that "applications like ChatGPT in education involve potential risks such as misinformation and biases in its training data" (p. 58), which could compromise the quality of educational interaction if left unaddressed. Additionally, Apaza Calsin et al. (2023) point out the need to "adapt interactive teaching methods to ensure proper learning" (p. 99), to counteract possible misuse of technology, such as plagiarism. Atencio-González et al. (2023) also stress that "critical thinking involves a complex set of variables, which do not solely depend on a tool, in this case, ChatGPT" (p. 25), suggesting that although these technologies may help foster critical thinking, they must be employed ethically and complemented with traditional pedagogical methods that promote deeper, reflective learning.

Student Learning Assessment

This category investigates how teachers perceive the impact of GPT on their evaluation methods, considering assessment as a process culturally laden with meanings. It explores how GPT redefines cultural norms of what constitutes "good" or "fair" evaluation and how educators interpret these new practices within the cultural context of educational institutions.

The incorporation of artificial intelligence in the evaluation of student learning is significantly transforming teachers' perceptions of the effectiveness and fairness of their evaluation methods. According to Magallanes Ronquillo et al. (2023), "artificial intelligence can address some of the greatest challenges currently facing the education sector, develop innovative teaching and learning methods, and ultimately accelerate progress towards the SDGs" (p. 1599), suggesting that these technologies can optimize educational processes, including evaluation. This optimization becomes evident as "ChatGPT is a powerful tool that will impact the teaching and learning processes in higher education and enables the creation of teaching aids" (Ojeda et al., 2023, p. 69). The precision and personalization offered by AI tools such as ChatGPT are particularly highlighted for providing more interactive and tailored learning experiences to individual student needs, as emphasized by Hakiki et al. (2023), who points out that "These findings underscore the benefits of using AI technology such as Chat GPT in creating learning experiences that are more interactive, and personalized, and motivate students' active participation in the learning process" (p. 869).

However, using artificial intelligence in assessment also presents significant challenges, particularly concerning equity and fairness in evaluation. Ojeda et al. (2023) caution that "the use of ChatGPT in university classrooms presents both advantages and disadvantages, depending on how it is used" (p. 69), emphasizing the need for a thoughtful approach to preventing AI-based evaluations from perpetuating inequalities or inherent biases. This approach is crucial for maintaining the integrity of the evaluation process in diverse and culturally sensitive educational contexts. These observations highlight the need to balance the benefits of personalization and

interactivity with implementing mechanisms that ensure transparency and fairness in AI-based evaluations.

2. Method

In this research, we used a quantitative methodology and administered a multiple-choice questionnaire using a Likert scale. They designed the questionnaire to assess the perceptions and attitudes of active teachers in Colombia toward using artificial intelligence technologies, such as ChatGPT, in their pedagogical practices. Researchers calibrated and validated the Likert scale, ensuring an appropriate level of internal consistency. Cronbach's Alpha coefficient reached 0.854, guaranteeing reliable data (Cronbach, 1951; Quero-Virla, 2010).

The sample included 74 active teachers in Colombia, selected to provide a detailed and relevant view of perceptions and attitudes toward using AI technologies, such as ChatGPT, across 73 educational institutions in the country. Researchers performed a detailed statistical analysis of the collected data, categorizing responses to identify significant patterns and trends. This analysis led to well-founded conclusions on key areas of interest in the study, such as perceptions of effectiveness, fairness, and ethical challenges related to AI use in teaching.

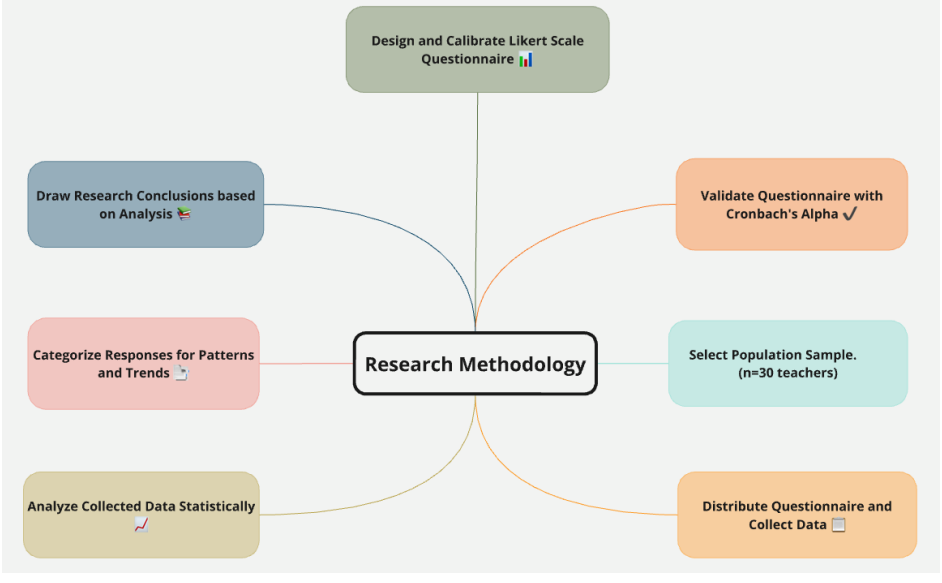

Fig. 1. Research Methodology Design

3. Results and Analysis

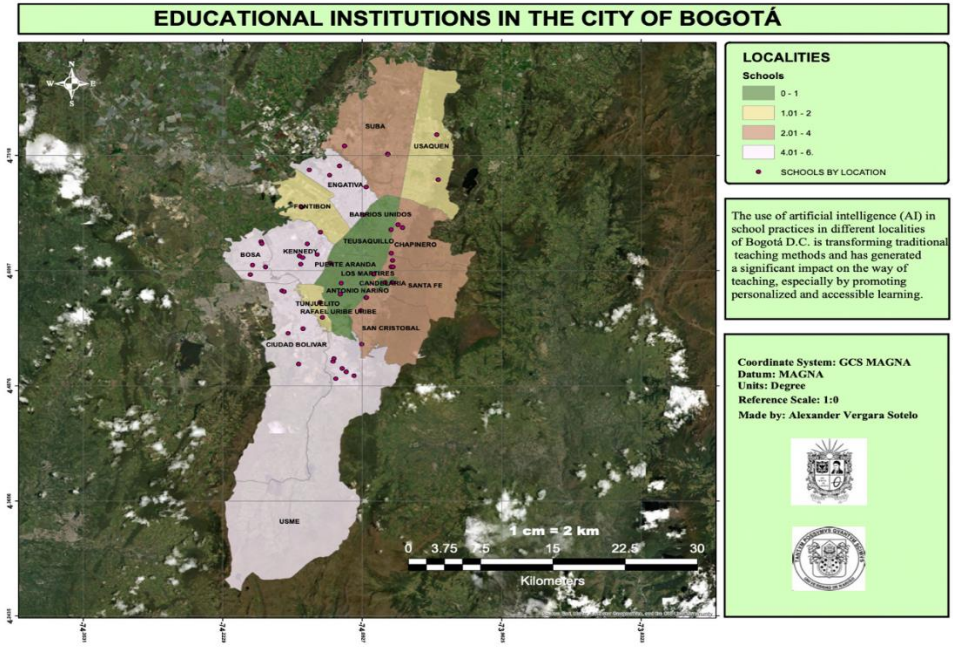

Fig. 2. Educational Institutions from the Research Sample in Bogotá D.C.

The institutions (Fig. 2) appear as red icons, representing various types of institutions and educational levels, such as schools, universities, or technical institutes.

The distribution of points on the map shows that the research sample included institutions from several districts in the city, which allowed for capturing a diversity of perceptions in different social, economic, and cultural contexts. This type of distribution proved useful for investigating variations in the perception of GPT's impact in pedagogical environments, especially considering Bogotá's geographic heterogeneity. The distribution provided the opportunity to capture a broad range of perspectives and experiences, leading to a more representative and accurate understanding of the cultural impact of GPT in different educational contexts. Additionally, it facilitated the identification of specific patterns that might vary depending on geographic area or type of institution.

In summary, the map shows broad and diverse coverage of educational institutions in the sample, helping to gain a more comprehensive view of GPT's cultural impact on education across different city contexts.

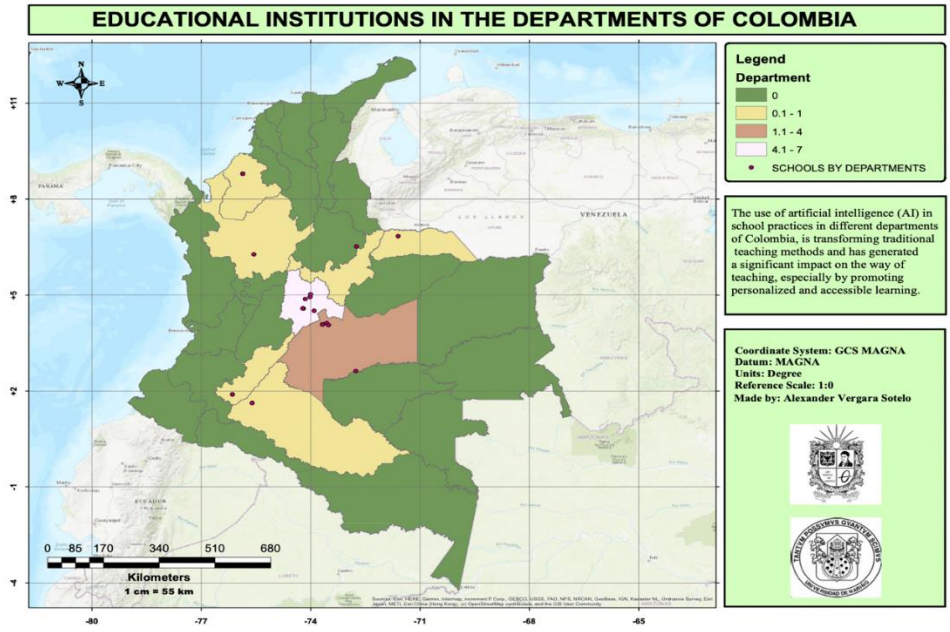

Fig. 3. Educational Institutions from the Research Sample in Colombia

The institutions (Fig. 3) span different regions of the country, indicating that the sample included a variety of regional contexts, both urban and rural.

The geographic coverage allowed for capturing perceptions from various areas of Colombia, which facilitated the collection of diverse opinions on the cultural impact of GPT in education. This regional variability helped identify differences in how institutions from different parts of the country adopted or responded to GPT technology in their pedagogical practice.

In summary, the distribution of institutions on the Colombian map (Fig. 3) reflects a broad and inclusive approach, which enabled consideration of the country's cultural and geographic diversity. Such an approach strengthened the representativeness of the results, offering a complete and more nuanced picture of GPT's impact in various educational contexts.

Three Perspectives from Principal Component Analysis

After conducting a multivariate analysis of the 18 statements from the Likert scale, the principal component analysis (PCA) identified three components (see Table 1).

PCA	Statement	Extraction Factor
PCA01. AI as part of contemporary teaching	P03. GPT helps me adapt my teaching methods to my students' cultural values.	0.778
	P04. The use of GPT preserves existing cultural norms regarding what is considered fair evaluation in my environment.	0.729

	P05. Incorporating GPT into my teaching has transformed the pedagogical culture of my classroom.	0.727
	P16. GPT allows me to personalize the evaluation of my students according to shared cultural values.	0.721
	P01. I use GPT to create activities that reflect and respect the cultural norms of my educational environment.	0.710
PCA02. AI as an element that complicates the educational process	P11. The activities created with GPT fail to incorporate and respect the cultural norms of my educational environment.	0.786
	P13. GPT complicates the adaptation of my teaching methods to my students' cultural values.	0.689
	P12. GPT has influenced the cultural perception of objectivity in the evaluations I conduct.	0.653
	P06. GPT complicates the personalization of my students' evaluations in line with shared cultural values.	0.626
	P14. The use of GPT has redefined the cultural norms regarding what constitutes fair evaluation in my environment.	0.617
	P02. GPT has left the cultural perception of objectivity in the evaluations I conduct unchanged.	0.539
PCA03. AI independent of cultural interactions	P17. The use of GPT has kept the cultural meanings in communication with my students intact, without generating new educational interactions.	0.867
	P08. With GPT, the cultural roles of teacher and student in my classroom have remained largely unchanged.	0.798

Table 1. Principal Components Obtained. Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization. The rotation converged in 4 iterations.

Description of Each Component

PCA01: Artificial Intelligence as Part of Contemporary Teaching

This first component reflects a positive view of ChatGPT, where teachers perceive the tool as well-integrated into their pedagogical practices, respecting and adapting to their environment's cultural values and norms. The high factor loadings show that teachers view GPT as an ally that enriches cultural interactions in the classroom.

P03 (0.778): Teachers believe that ChatGPT allows them to adapt their teaching methods to align with students' cultural values. This high factor loading suggests the tool is flexible and can personalize teaching according to each group's cultural particularities.

P04 (0.729): Many perceive that GPT does not interfere with the cultural norms that define fair evaluation, reinforcing the idea that AI can integrate into the educational process without altering the pre-existing principles of equity within the cultural environment.

P05 (0.727): Incorporating GPT into teaching has transformed the pedagogical culture of classrooms, as teachers view this technology as a tool that drives positive evolution in teaching, enriching traditional pedagogical practices through technological innovation.

P16 (0.721): GPT allows for the personalization of evaluations, which teachers consider crucial, as it aligns with the shared cultural values in the classroom. The personalization capacity reinforces the idea that GPT can address the cultural needs of each student group.

P01 (0.710): GPT is used to create activities that respect cultural norms, indicating that teachers perceive the technology as non-intrusive and respectful of the cultural traditions of the educational environment.

PCA02: Artificial Intelligence as an Element that Complicates the Educational Process

This second component presents a more critical view of GPT. Teachers perceive difficulties in integrating technology with the cultural norms and values of their classrooms. The factor loadings in this case indicate that teachers experience tensions and obstacles when adapting GPT to their cultural context.

P11 (0.786): GPT fails to incorporate and respect the cultural norms of the educational environment. The highest factor loading in this ChatGPT's ability to personalize learning and provide adaptive feedback reflects this transformation, enabling teachers to design "more effective and adaptive teaching activities for students" (González-González, 2023, p. 57). component suggests that teachers perceive a mismatch between the technology and cultural expectations, which can lead to frustration and challenges in its use.

P13 (0.689): GPT is perceived as making it difficult to adapt teaching methods to the student's cultural values. This indicates that, for some teachers, the technology is not flexible or suitable enough to reflect the cultural particularities of their students.

P12 (0.653): GPT influences the cultural perception of objectivity in evaluations. Although the factor loading is not as high as in other items, it suggests that some teachers feel GPT introduces elements that change how fairness or justice is understood in evaluation.

P06 (0.626): GPT complicates the process of personalizing evaluations in line with shared cultural values. Teachers believe that AI creates barriers, making it challenging to adjust assessment to the specific cultural contexts of students.

P14 (0.617): GPT redefines cultural norms regarding what constitutes fair evaluation. This suggests that some teachers experience a shift in expectations or assessment practices, where GPT may challenge traditional notions of fairness and equity in the classroom.

P02 (0.539): GPT has left the cultural perception of objectivity in evaluations unchanged. Although this has the lowest factor loading in this group, it shows that some teachers need to perceive a significant change in how objectivity is understood in evaluations when using AI.

PCA03: Artificial Intelligence Independent of Cultural Interactions

The third component reflects a neutral or passive view of GPT, where teachers perceive that technology has not significantly impacted cultural interactions within the classroom. The high factor loadings suggest that, in this case, GPT does not introduce changes to either roles or cultural norms, remaining on the margins of traditional pedagogical dynamics.

P17 (0.867): GPT preserves the cultural meanings of communication with students without generating new educational interactions. The highest factor loading in the analysis indicates that

teachers perceive GPT as a passive agent that neither alters interactions nor introduces new cultural meanings or dynamics.

P08 (0.798): GPT has kept the cultural roles of teacher and student unchanged, suggesting that, for many teachers, technology has not transformed traditional classroom relationships, preserving the hierarchical structure and conventional pedagogical roles.

4. Discussion

The discussion of the Principal Component Analysis (PCA) findings provides deeper insights into the various perspectives on the impact of ChatGPT in teaching, contrasting these results with relevant theoretical frameworks. Below is a detailed interpretation of the three components identified and their relationship to previous theoretical studies.

PCA01: Artificial Intelligence as Part of Contemporary Teaching

This component reflects a positive perception of using ChatGPT in the classroom. Teachers view it as a tool that adapts to students' cultural values and promotes personalized teaching (P03, P04, P05). This finding aligns with research by González-González (2023), who asserts that AI can positively transform pedagogical practices, integrating respectfully with pre-existing cultural norms. The high value of P03 (0.778), which indicates that teachers adapt their teaching methods to students' cultural values, reinforces Buckingham's (2008) idea about the role of digital technologies in facilitating personalized learning by considering students' identities.

Additionally, the perception that ChatGPT does not alter principles of fairness in evaluation (P04, 0.729) resonates with the argument by Atencio-González et al. (2023), who suggest that AI can improve teaching without compromising academic and cultural standards of justice. This component also suggests that teachers see GPT as an opportunity to innovate and enrich pedagogical interactions without challenging cultural norms, which is essential to maintaining fairness in diverse educational environments.

PCA02: Artificial Intelligence as an Element that Complicates the Educational Process

This component reveals tensions and challenges in adopting GPT in the educational context. Teachers report that the technology complicates adaptation to the cultural norms of their classrooms and, in some cases, compromises the objectivity of evaluations (P11, P13, P12). These results align with observations by Hakiki et al. (2023), who noted that AI, if not well integrated, can create confusion or misalignment regarding cultural expectations, particularly concerning fairness in evaluation. P11 (0.786), which points to GPT's failure to incorporate cultural norms, highlights a common criticism of educational technology: its inability to adjust to diverse sociocultural contexts fully, consistent with Williamson's (2017) studies that suggest adopting digital technologies in education can be problematic when facing cultural variability.

Additionally, the perceived impact on the objectivity of evaluations (P12, 0.653) suggests that some teachers see GPT as a threat to traditional norms of fairness and equity in assessments. This finding contrasts with the optimistic view in PCA01, showing that GPT integration is only

sometimes perceived as positive or neutral, as noted by Magallanes Ronquillo et al. (2023), who identified that AI can cause misalignments when not correctly aligned with educational values

PCA03: Artificial Intelligence Independent of Cultural Interactions

The third component suggests a neutral perception of ChatGPT, where the technology does not significantly alter cultural or pedagogical dynamics in the classroom (P17, P08). This result, which indicates that the cultural roles of teachers and students remain unchanged, aligns with the findings of Ojeda et al. (2023), who concluded that the implementation of GPT in university contexts does not always produce disruptive changes and sometimes functions as a complementary resource without influencing traditional teaching structures.

The high factor loading of P17 (0.867), which shows that GPT has not generated new educational interactions, aligns with McLuhan and Lapham's (1994) theory of "media as extensions of man." In this case, GPT functions as an extension of existing pedagogical practices without significantly altering cultural interactions, instead staying on the periphery.

The three components identified through PCA show a diversity of perceptions among teachers, highlighting the complexity of integrating artificial intelligence technologies like ChatGPT into education. On one hand, PCA01 reflects a successful and adaptable integration, where AI aligns with cultural and pedagogical needs, consistent with studies highlighting the transformative benefits of technology in teaching (González-González, 2023; Buckingham, 2008). On the other hand, PCA02 reveals the difficulties in adapting GPT to specific cultural contexts, reinforcing literature that points to the inherent challenges of educational technology in culturally diverse environments (Williamson, 2017; Hakiki et al., 2023).

Finally, PCA03 presents a view where GPT does not alter pedagogical or cultural dynamics, implying that educators may see the technology as a neutral tool that introduces no significant changes, as suggested by McLuhan and Lapham (1994) and Ojeda et al. (2023). Such a perspective reinforces that artificial intelligence in education impacts contexts differently, depending on teachers' perceptions of its utility and integration.

5. Conclusions

PCA01 reveals that teachers positively perceive ChatGPT's use in the classroom. They regard it as a tool that supports teaching and aligns with cultural norms and values, highlighting a smooth integration of technology into education. Teachers see ChatGPT as a facilitator that improves their pedagogical abilities.

In contrast, PCA02 reflects a more critical view, where the technology presents difficulties adjusting to the classroom's cultural norms. The tensions manifest in the personalization of teaching and evaluation, suggesting that ChatGPT may be perceived as an obstacle to traditional educational practices in specific contexts.

On the other hand, PCA03 suggests a neutral stance, where ChatGPT does not alter cultural or pedagogical interactions. Teachers see it as applicable but without a significant impact on pre-existing educational structures and roles.

The results show that the adoption of ChatGPT in education is heterogeneous. While some teachers perceive it as a transformative tool, others need help to align it with cultural norms, and a third group does not observe a significant impact on pedagogical interactions. This diversity of perceptions underscores the need for contextual and differentiated approaches in implementing educational technologies, considering their opportunities and challenges. In summary, the three components identified reflect these perspectives: PCA01 highlights ChatGPT's potential as a pedagogical facilitator, PCA02 reveals complications in its adaptation to cultural norms, and PCA03 presents it as a neutral tool in educational dynamics. These findings underscore the variety of experiences that teachers have regarding the use of artificial intelligence in culturally diverse educational contexts.

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