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Reflections on the importance of English, Portuguese, and Chinese for managing artificial intelligence and teacher interactions

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ABSTRACT: The expansion of artificial intelligence (AI) in education is transforming information management, pedagogical practices, and human interactions in teaching. Systems incorporate intelligent platforms, learning analytics, and automated tools that mediate knowledge and teacher decisions. Language becomes crucial for information management and human-technology interaction.

Methodology: Reflective analysis based on interdisciplinary literature from 2021–2025. English, Portuguese, and Chinese are key languages for managing AI systems and mediating human-AI interactions in teaching practice. Multilingual competence facilitates access to global scientific and technological knowledge and reduces cognitive and emotional overload for educators.

Discussion: Multilingualism promotes the humanized integration of AI in education, strengthening information equity and teacher well-being.

Conclusions/Contributions: Multilingual proficiency is essential for sustainable educational innovation, suggesting training models that integrate strategic languages with AI and professional well-being.

Keywords: Artificial intelligence, pedagogy, management, languages, teacher.

Reflexiones sobre la importancia del inglés, portugués y chino para gestionar inteligencia artificial e interacciones docentes

RESUMEN: La expansión de la inteligencia artificial (IA) en la educación transforma gestión de información, prácticas pedagógicas e interacciones humanas en docencia. Sistemas incorporan plataformas inteligentes, analítica de aprendizaje y herramientas automatizadas que median conocimiento y decisiones docentes. El lenguaje se vuelve determinante para gestión informacional e interacción humano-tecnológica. **Metodología:** Análisis reflexivo basado en literatura interdisciplinaria de 2021-2025. **Resultados:** Inglés, portugués y chino son lenguas clave para gestionar sistemas de IA y mediar interacciones humano-IA en práctica docente.

Competencia multilingüe facilita acceso a conocimiento científico-tecnológico global y reduce sobrecarga cognitiva-emocional en educadores. **Discusión:** Multilingüismo promueve la integración humanizada de IA en educación, fortaleciendo equidad informacional y bienestar docente. **Conclusion/Aporte:** Dominio multilingüe es esencial para innovación educativa sostenible, sugiriendo modelos formativos que articulen lenguas estratégicas con IA y bienestar profesional.

Palabras Clave: Inteligencia Artificial, pedagogía, gestión, idiomas, docente.

Reflexões sobre a importância do inglês, do português e do chinês para gerenciar a inteligência artificial e as interações docentes

RESUMO: A expansão da inteligência artificial (IA) na educação transforma a gestão de informação, práticas pedagógicas e interações humanas na docência. Sistemas incorporam plataformas inteligentes, análise de aprendizado e ferramentas automatizadas que mediam o conhecimento e decisões docentes. A linguagem torna-se determinante para a gestão informacional e interação humano-tecnológica. **Metodologia:** Análise reflexiva baseada em literatura interdisciplinar de 2021-2025. **Resultados:** Inglês, português e chinês são línguas chave para gerenciar sistemas de IA e mediar interações humano-IA na prática docente.

Competência multilíngue facilita o acesso ao conhecimento científico-tecnológico global e reduz sobrecarga cognitivo-emocional em educadores. **Discussão:** Multilinguismo promove integração humanizada da IA na educação, fortalecendo equidade informacional e bem-estar docente. **Conclusões/Aportes:** Domínio multilíngue é essencial para inovação educativa sustentável, sugerindo modelos formativos que articulem línguas estratégicas com IA e bem-estar profissional.

Palavras-chave: Inteligência Artificial, pedagogia, gestão, idiomas, docente.

Reflections on the importance of English, Portuguese and Chinese to manage artificial intelligence and pedagogical interactions

RÉSUMÉ : L'expansion de l'intelligence artificielle (IA) dans l'éducation transforme la gestion de l'information, les pratiques pédagogiques et les interactions humaines dans l'enseignement. Les systèmes intègrent des plateformes intelligentes, l'analyse d'apprentissage et des outils automatisés qui médiatisent la connaissance et les décisions enseignantes. Le langage devient déterminant pour la gestion informationnelle et l'interaction humain-technologique. **Méthodologie :** Analyse réflexive basée sur la littérature interdisciplinaire de 2021-2025. **Résultats :** L'anglais, le portugais et le chinois sont des langues clés pour gérer les systèmes d'IA et médiatiser les interactions humain-IA dans la pratique enseignante. La compétence multilingue facilite l'accès à la connaissance scientifique-technologique globale et réduit la surcharge cognitive-émotionnelle chez les éducateurs. **Discussion :** Le multilinguisme promeut l'intégration humanisée de l'IA en éducation, renforçant l'équité informationnelle et le bien-être enseignant.

Conclusions/Apports : La maîtrise multilingue est essentielle pour l'innovation éducative durable, suggérant des modèles formatifs qui articulent les langues stratégiques avec l'IA et le bien-être professionnel.

Mots-clés: Intelligence Artificielle, pédagogie, gestion, langues, enseignant.

1. Introduction

Information management has become a key strategic pillar of contemporary education systems, especially in a context characterized by rapid digitalization and the increasing integration of artificial intelligence-based technologies. Learning management platforms, intelligent tutoring systems, predictive models of academic performance, and educational analytics tools rely on large volumes of data, complex algorithmic structures, and constant flows of information that require specialized human interpretation. In this scenario, teaching is redefined as a practice profoundly mediated by intelligent technologies that influence both cognitive processes and human interactions inside and outside the classroom (Wang et al., 2024).

Several systematic reviews have indicated that artificial intelligence in education not only transforms teaching and learning processes but also the dynamics of pedagogical decision-making and institutional management, increasing the informational complexity faced by teachers (Wang et al., 2024). This complexity demands new professional skills focused on the critical interpretation of information and the ethical and reflective use of intelligent technologies.

In this context, proficiency in strategic languages becomes centrally important. English remains the dominant language in scientific production, technological development, and technical documentation related to artificial intelligence. Portuguese plays a fundamental role in educational and academic networks connecting Europe, Latin America, and Africa, facilitating knowledge transfer processes in culturally diverse contexts. Chinese, for its part, is positioned as a key language in the development, application, and governance of advanced artificial intelligence systems with global impact, especially in the educational field (Wang et al., 2020; Rios, 2025). This article proposes a critical and expanded reflection on the importance of these languages for the management of artificial intelligence and human interactions in teaching, from an information management perspective oriented toward educational sustainability and human well-being.

1.1. Information management, artificial intelligence and teaching

Recent literature agrees that artificial intelligence in education cannot be understood solely as a set of technical tools or automated solutions. On the contrary, it is configured as a complex informational ecosystem that integrates data, algorithms, human decisions, regulatory frameworks, and diverse sociocultural contexts (Wang et al., 2024). The effective management of this ecosystem requires teachers to possess advanced information literacy skills, including the ability to search, evaluate, interpret, contextualize, and communicate information generated or mediated by intelligent systems.

From this perspective, language fulfills an essential mediating function between artificial systems and human subjects. Most of the conceptual, technical, and regulatory developments in educational artificial intelligence are primarily available in English, making this language a requirement for professional development, critical understanding of the systems, and active participation in international academic communities. However, information management focused exclusively on a single language can generate cognitive, cultural, and emotional barriers that affect the quality of teaching practice and limit the meaningful appropriation of technology, especially in diverse educational contexts.

1.2. Multilingualism, access to scientific knowledge and information equity

Equitable access to scientific knowledge is one of the fundamental principles of information management in education. While the dominance of English has facilitated the standardization of scientific communication, it has also generated asymmetries in the production and dissemination of knowledge that affect non-English-speaking academic communities. In this sense, multilingualism emerges as a key strategy for reducing information gaps and promoting more inclusive participation in the construction of scientific knowledge.

Portuguese plays a strategic role in disseminating knowledge in countries and regions where the adoption of artificial intelligence in education is expanding, fostering processes of pedagogical

contextualization, cultural adaptation, and critical appropriation of technologies developed in other linguistic environments. Complementarily, Chinese represents a gateway to educational models, institutional experiences, and technological developments that are redefining the global landscape of artificial intelligence, particularly in Asia (Wang et al., 2020; Rios, 2025). Multilingual information management allows teachers to compare approaches, understand different technological design logics, and enrich human interactions in AI-mediated educational environments.

2. Methodology

2.1. Mastery of English for the management of educational artificial intelligence

Mastery of the world's most widely spoken and strategic languages is now a determining factor for the effective management of artificial intelligence and for the quality of teacher interactions in digitized educational contexts. In a global scenario characterized by the intensive circulation of information, the accelerated development of smart technologies, and the interconnection of educational systems on an international scale, language is positioned as a key resource for academic and professional cognitive power, especially in AI-mediated environments (Wang et al., 2024).

English is consolidating its position as the predominant language in scientific production, technological innovation, and the development of artificial intelligence systems. Most algorithms, machine learning models, intelligent educational platforms, technical documentation, and conceptual frameworks on artificial intelligence in education are initially produced and disseminated in this language, making its proficiency a requirement for timely access to specialized and up-to-date knowledge (Wang et al., 2024). Consequently, English proficiency not only facilitates the technical understanding of these systems but also allows teachers to critically interpret the results generated by artificial intelligence, participate in international academic communities, and make informed pedagogical decisions from an information management perspective.

From a commercial and geostrategic perspective, English is one of the main languages of global technology, innovation, and education markets. Educational artificial intelligence platforms, digital services, and smart learning environments operate in economic ecosystems where this language predominates, which conditions both access to the tools and the understanding of their operational logic. Teachers who are proficient in English are better positioned to evaluate educational technologies, adapt solutions to local contexts, and participate in international academic cooperation projects, thus strengthening their information management capacity in complex educational environments (Pereira et al., 2025).

2.2. Chinese as an emerging strategic language in AI-mediated teaching interactions

Additionally, Chinese is gaining increasing relevance as one of the most widely spoken languages in the world and as a strategic language in the development and application of artificial intelligence. China has established itself as a central player in the research, investment, and implementation of smart technologies in the educational, productive, and commercial sectors, making Chinese a key language for understanding alternative models of technological and educational development (Wang et al., 2020; Rios, 2025).

Proficiency in Chinese allows access to primary sources of knowledge, analysis of specific technological approaches, and an understanding of cultural, organizational, and pedagogical logics distinct from Western ones. In the context of AI-mediated teacher interactions, this linguistic competence contributes to strengthening intercultural communication and enabling a more critical interpretation of the assumptions implicit in intelligent systems. Several studies have indicated that these systems are not neutral, as they incorporate cognitive and linguistic cultural frameworks that influence how content is presented, data is interpreted, and educational recommendations are generated (Wang et al., 2020).

Furthermore, proficiency in the world's most widely spoken languages, especially English and Chinese, can act as a protective factor against information overload and teacher stress. Difficulty managing complex, technologically mediated information has been associated with higher levels of stress, burnout, and psychological distress in highly demanding educational and professional contexts (Prasad et al., 2021; Valdez López et al., 2022). The ability to directly access original sources, understand technical instructions without intermediaries, and communicate clearly in complex digital environments reduces uncertainty, strengthens professional self-efficacy, and fosters more adaptive coping strategies (Paredes Garcés & Chasi, 2020; Santamaría-Juárez, 2022). From a well-being and positive education perspective, linguistic proficiency also contributes to creating more favorable conditions for teachers' professional development. Strengthening skills that increase a sense of control, understanding of the technological environment, and meaningful participation in educational communities is associated with higher levels of well-being and engagement in teaching practice (Seligman et al., 2009). In this sense, strategic multilingualism focused on English and Chinese not only improves the management of artificial intelligence but also contributes to preserving teachers' cognitive and emotional well-being—a key aspect for the sustainable integration of technology.

In summary, the emphasis on mastering English and Chinese as global and commercially strategic languages strengthens reflections on the management of artificial intelligence and teacher interactions by recognizing language as a structural component of educational information management. The conscious integration of these languages into teacher training and institutional policies for educational innovation is fundamental for an informed, critical, inclusive adoption of artificial intelligence that is oriented toward sustainable human development and supported by a comprehensive understanding of psychological well-being and the impact of technological environments on people (Palomino Quiroz, 2021; Wojujutari et al., 2024).

2.3. Human interactions, teaching and well-being in artificial intelligence environments

The integration of artificial intelligence into teaching has significantly increased the cognitive, emotional, and organizational demands placed on teachers. Constant exposure to automated systems, intensive information flows, and algorithm-mediated decision-making processes can lead to information overload, stress, and burnout. Several studies have demonstrated high levels of stress and coping difficulties in highly demanding and technologically advanced educational and professional contexts (Prasad et al., 2021; Valdez López et al., 2022).

The difficulty in managing complex and multilingual information can intensify these experiences of distress, especially when teachers lack the necessary language skills to understand how systems work or to access specialized training resources. Research on academic stress and stress perception shows that informational uncertainty acts as a significant stressor in contemporary educational contexts (Paredes Garcés & Chasi, 2020; Santamaría-Juárez, 2022). In this sense, developing proficiency in English, Portuguese, and Chinese can contribute to reducing uncertainty, strengthening teacher self-efficacy, and promoting more adaptive coping strategies.

2.4. Artificial intelligence, positive education and teacher creativity

From the perspective of positive education, emotional well-being, motivation, and a sense of purpose are recognized as essential conditions for meaningful learning and sustainable human development. This approach highlights the importance of creating educational environments that promote the personal and professional flourishing of both teachers and students (Seligman et al., 2009). Artificial intelligence, when managed ethically and reflectively, can support these objectives through personalized learning, adaptive feedback, and the design of innovative educational experiences.

Recent research indicates that multilingual virtual environments combined with pedagogical strategies such as gamification enhance creative thinking, active participation, and engagement in digitally mediated educational contexts (Pereira et al., 2025). Within this framework, the teacher's linguistic competence is fundamental for designing educational experiences that

integrate artificial intelligence without reducing teaching to mechanical or impersonal processes. Multilingualism expands the possibilities for pedagogical design and strengthens the human dimension of teaching in digital environments.

3. Discussion

3.1. Chinese, a key language, in the management of educational artificial intelligence

China has established itself as a major player in the development and application of artificial intelligence, including its large-scale implementation in education systems. Understanding these developments requires not only technical knowledge but also a cultural and linguistic approach that allows for the interpretation of the underlying ethical, pedagogical, and organizational assumptions. Studies on psychological responses and social contexts in China show that interactions with advanced technologies are deeply mediated by cultural and linguistic factors (Wang et al., 2020).

The incorporation of Chinese as a strategic language in educational information management allows teachers to access primary sources, broaden their overall understanding of artificial intelligence, and participate in international debates that influence technological governance. This openness is especially relevant for internationally focused information management journals interested in comparative, multicultural, and interdisciplinary approaches.

3.2. Implications for the management of educational information

From an information management perspective, multilingualism should be considered a cross-cutting and essential skill for teaching in the age of artificial intelligence. Educational institutions face the challenge of designing training policies that integrate information literacy, linguistic competence, and attention to the psychological well-being of teachers.

Evidence from psychological well-being assessment tools underscores the need for systematic monitoring of the impact of technological environments on individuals, especially in highly demanding educational contexts (Palomino Quiroz, 2021; Wojujutari et al., 2024). Information management that is sensitive to language and human well-being not only improves the effectiveness of educational artificial intelligence but also contributes to a more ethical, responsible, and sustainable adoption of these technologies.

4. Conclusion

The reflections developed in this article allow us to affirm that English, Portuguese, and Chinese play a strategic role in the management of artificial intelligence and human interactions in teaching. Multilingual competence facilitates access to global scientific knowledge, strengthens teachers' cognitive and emotional well-being, and fosters a more ethical, creative, and inclusive integration of artificial intelligence in education.

For journals specializing in information management, this approach offers an integrative vision that recognizes language as a strategic resource in the governance of educational artificial intelligence. Future work could delve deeper into institutional training models that articulate multilingualism, artificial intelligence, and teacher well-being as central pillars of contemporary educational innovation.

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María Nora Santamaria Ruiz (25%): Writing – original draft, Writing – revision and editing,

Zoila Ayvar Bazán (25%): Supervision, Validation and Visualization.

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