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Inteligência Artificial na Educação: consciência crítica, relacional e ética

Artificial Intelligence in Education: critical, relational and ethical awareness

In memoriam de Maria da Conceição Martins
Membro da Comissão Organizadora do INCTE'25

Pela seriedade com que abraçou cada desafio, pela dedicação constante e pelo contributo valioso à construção do INCTE.
A sua marca permanece no rigor do trabalho, no cuidado com os detalhes e na forma como continua a inspirar e a iluminar, discreta, mas decisivamente, o que fazemos e como fazemos.

Com gratidão e serena saudade.

Students' beliefs about the use of Artificial Intelligence in teacher training: challenges and opportunities in music creation

Creencias de los estudiantes sobre el uso de la IA en la formación del profesorado: retos y oportunidades en la creación musical

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Abstract

This article describes and analyses innovative pedagogical practices implemented in the context of higher education, focusing on the use of generative Artificial Intelligence (AI) tools in the training of future teachers. The main aims of the research were to enable students to manipulate the AIVA tool in the field of music creation and composition and to promote essential 21st-century skills such as critical thinking, creativity, and collaboration between peers. As part of the methodology, an initial questionnaire was administered to assess students' prior knowledge, beliefs, and expectations regarding AI and its potential in music creation. The results showed a generalized familiarity with tools such as ChatGPT, especially for research and idea generation purposes, but revealed specific gaps in the use of generative AI in creative and artistic contexts. This study contributes to the academic debate around Artificial Intelligence in Education (AIEd), reflecting on the transformative possibilities of these technologies and the ethical and pedagogical challenges associated with their implementation in educational contexts.

Keywords: generative artificial intelligence, teacher training, students' beliefs, musical creation.

Resumen

Este artículo describe y analiza prácticas pedagógicas innovadoras aplicadas en el contexto de la enseñanza superior, centrándose en el uso de herramientas generativas de Inteligencia Artificial (IA) en la formación de futuros profesores. Los principales objetivos de la investigación eran capacitar a los estudiantes para manipular la herramienta AIVA en el ámbito de la creación y composición musical y fomentar competencias esenciales del siglo XXI, como el pensamiento crítico, la creatividad y la colaboración entre iguales. Como parte de la metodología, se administró un cuestionario inicial para evaluar los conocimientos previos, las creencias y las expectativas de los estudiantes en relación con

la IA y su potencial en la creación musical. Los resultados mostraron una familiaridad generalizada con herramientas como el ChatGPT, especialmente con fines de investigación y generación de ideas, pero revelaron lagunas específicas en el uso de la IA generativa en contextos creativos y artísticos. Este estudio contribuye al debate académico en torno a la Inteligencia Artificial en la Educación (AIEd), reflexionando sobre las posibilidades transformadoras de estas tecnologías y los retos éticos y pedagógicos asociados a su implementación en contextos educativos.

Palabras clave: inteligencia artificial generativa, formación de profesorado, creencias de los estudiantes, creación musical.

1 Introduction

This research adopted an exploratory and descriptive approach to understanding higher education students' perceptions, expectations, and experiences regarding the use of generative Artificial Intelligence (AI) tools in education, particularly in music creation and teacher training. The study was carried out as part of a thematic seminar entitled *"Creación sonora con Inteligencia Artificial generative: nuevos desafíos y posibilidades para la formación docente"* (Sound creation with generative Artificial Intelligence: new challenges and possibilities for teacher training), organized at the University of Valladolid, Spain, with the participation of 78 students from the Basic Education and Dual Qualification degree courses. This educational experience was carried out as part of the Teaching Innovation Project "*Creación sonora y competencias transversales en la formación de maestros/as: proyectos STEAM en el aula de música*" (Sound Creation and Transversal Competences in Teacher Training: STEAM projects in the music classroom), sponsored by UVa's Vice Rectorate for Teaching Innovation and Digital Transformation.

1.1 Context and reasons for the investigation

AI offers numerous applications in education, particularly in teaching and learning processes (Celik et al., 2022). This digital evolution does not imply reducing the role or responsibilities of teachers, equipping machines with pedagogical skills, or diminishing the demand for educators in the future (Dillenbourg, 2016; Zawacki-Richter et al., 2019, 2024). Rather than speculating on whether AI might replace teachers, the focus should be on understanding the benefits AI provides to educators and how these advantages can reshape their roles in the classroom (Holmes et al., 2019; Hrastinski et al., 2019). To make AI pedagogically relevant, it is crucial to explore both the opportunities it offers teachers and the challenges they face in AI-based teaching. However, as Celik et al. (2022) note, limited attention has been given to AI-based education from the teacher's perspective, underscoring the relevance of this research.

2 Methodology

To address the research objectives effectively, an ad hoc questionnaire was developed and implemented to gather relevant data, structured into four sections:

1) Students' previous knowledge and daily use of Artificial Intelligence.
2) Students' beliefs about the potential of Artificial Intelligence in music creation/composition.

3) Perceptions of the benefits and limitations of Artificial Intelligence applied to music teaching.
4) View on the inclusion of Artificial Intelligence tools in initial teacher training.

Although the methodological approach was primarily qualitative, the research integrated quantitative elements to generate fundamental data from the collected responses. These quantitative results were presented using basic statistical metrics (percentages) and visually displayed through graphic representations, enhanced with the support of AI tools. This combination of qualitative insights and quantitative data provided a comprehensive understanding of the impact and outcomes of the educational intervention.

The results from this analysis have guided important reflections on the use of AI tools by students and their pedagogical view of these tools, promoting a critical and balanced view of their potential and the inherent ethical and educational challenges.

3 Results

3.1 Students' previous knowledge and daily use of Artificial Intelligence

According to the results obtained, almost all the students showed that they knew at least one AI tool (Figure 1). The answers were quite diverse regarding the specific tool and why they use it, with *ChatGPT* coming out on top with 92,50 %. In addition to OpenAI's Large Scale Language Model (LLM), students mentioned *Gemini* (Google's LLM), *Suno* (an AI tool associated with music creation), *Copilot* (Microsoft's Assistant), the *Bing* search engine and the virtual assistants from *Apple* (Siri) and *Windows* (Cortana). However, only 94,90 % said they had used an AI tool at least once (Figure 2).

Figure 1

Do you know any AI tools?

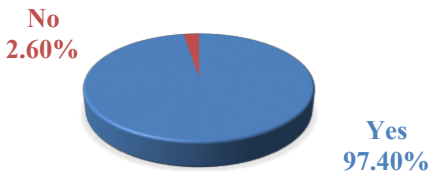
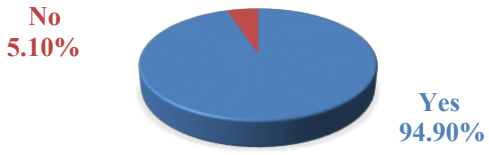


Figure 2

Have you ever used an AI tool?

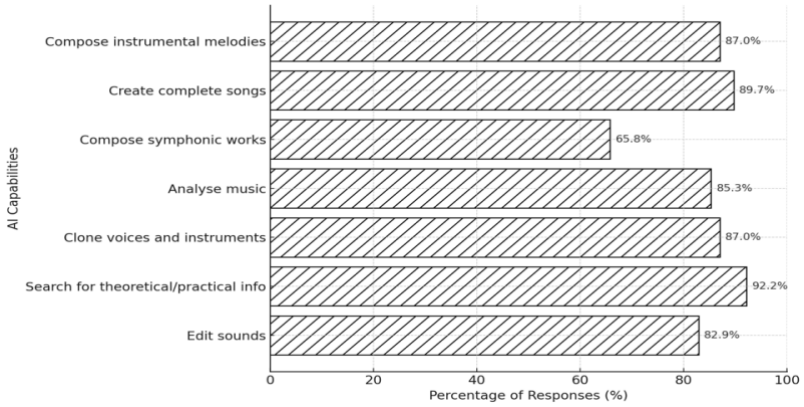


3.2 Students' beliefs about the potential of Artificial Intelligence in music creation/composition

Concerning the students' expectations and perceptions of the capabilities of AI tools in music creation and composition, most of them gave this technology great potential and attributes in this sense (Figure 3).

Figure 3

What do you think can be done with AI in the field of music? (generated by ChatGPT)

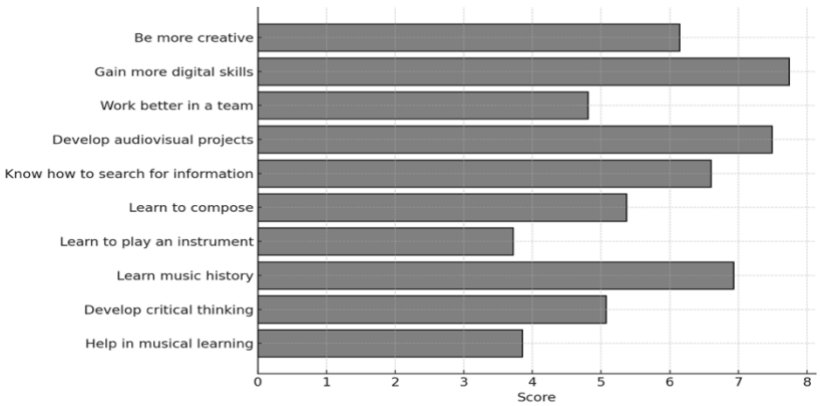


3.3 Perceptions of the benefits and limitations of Artificial Intelligence applied to music teaching

The data obtained on students' perceptions of the benefits and limitations of AI in the field of music learning highlights important tendencies. The vast majority believe that AI can indeed be beneficial when it comes to activities and tasks related to creativity, as well as in terms of developing digital skills, researching information, and teamwork. However, categories directly related to practical music learning, such as composition, studying a musical instrument, or learning the history of music, received lower scores. This suggests that although AI is seen as useful in supporting creativity and the applicability of general skills, students do not consider it essential to the practical acquisition of specific musical competence (Figure 4).

Figure 4

What musical skills can AI enhance? (generated by ChatGPT)

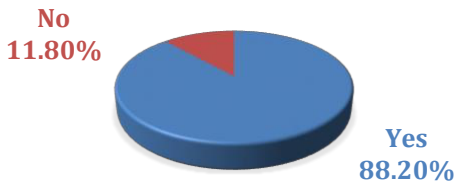


3.4 View on the inclusion of Artificial Intelligence tools in initial teacher training

When asked about their educational vision of the use of AI tools, namely the inclusion of AI tools in their initial training, most respondents (88.20%) were in favor, considering it essential to acquire digital and technological skills to use these tools in the pedagogical and educational context. The motives related to the benefits of this inclusion included: (i) searching for and organizing information, (ii) the possibility of creating educational activities and content, (iii) promoting creativity and different perspectives, and (iv) adapting content to students' needs. However, a minority (11.80%) expressed some skepticism and concerns. Even though they recognize its potential, they raise certain reservations related to the limitation of critical thinking, the replacement of human interaction, overuse, and possible dependence on these resources (Figure 5).

Figure 5

Do you consider it necessary to learn how to manipulate Artificial Intelligence in your training as a future teacher?



4 Discussion

The research results reveal a widespread acknowledgment of the potential of AI tools in education, alongside challenges in their integration into teacher training. While students demonstrated familiarity with AI and identified practical applications, they also expressed concerns about its relevance to specific skills, such as learning musical competencies. Most students viewed AI as essential for teacher preparation, highlighting its role in personalizing instruction, creating materials, and enhancing efficiency. However, their reservations underline the need for a critical and balanced approach to AI integration, aligning innovation with fundamental pedagogical principles—a perspective consistent with ongoing debates in the literature. The findings highlight the importance of preparing future teachers with technical skills and critical and ethical competencies in using AI. Emphasizing the teacher's role as a mediator and facilitator is essential to promote the responsible use of these tools and to ensure that they enhance rather than undermine pedagogical practices. Teachers are pivotal participants in the AI-based teaching and learning process (Seufert et al., 2021), and their perspectives, experiences, and expectations must be considered to ensure the successful adoption of AI in schools (Holmes et al., 2019).

5 Conclusions

Integrating AI into music teacher training holds significant potential for enhancing teaching practices and learning outcomes. To implement AI effectively and ethically in this context, the following strategies are recommended:

- Providing teachers with comprehensive training in AI tools, focusing on their pedagogical applications in music education.
- Developing clear guidelines on the ethical use of AI to ensure privacy, equity, and inclusivity in educational environments.
- Encouraging the co-creation of educational resources using AI to foster creativity and innovation in music learning.

This intervention was conducted with a group of pre-service teacher education students and designed as an initial introduction to the use of AI in music creation/composition. Consequently, the potentialities observed are limited to this specific context and audience. Future research should expand the sample size, explore the application of AI in diverse educational contexts, and assess the long-term impact on students' musical skills and creative development.

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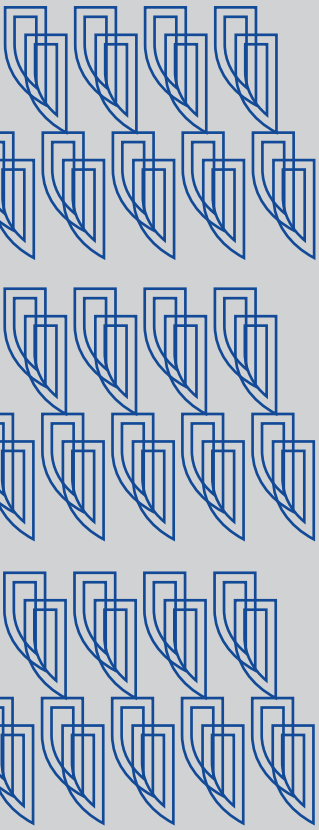

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