Artificial Intelligence and the management of the University curriculum by competencies

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Abstract: Artificial intelligence (AI) can transform university curriculum management by competencies by automating the organization, search and filtering of educational resources. The resources provided by AI offer personalized content recommendations, facilitating more efficient management for students and teachers. Qualitative research, based on a review of ten reference sources and expert discussions, highlighted the importance of learning personalization, educational quality improvement, sociocultural adaptation and active student participation. The results determined that the integration of AI can improve curricular programming by offering personalization and continuous assessment, as long as it is aligned with these principles. In conclusion, AI can enrich university education by making it more dynamic and adapted to individual and collective needs, facilitating more effective training for today's work environment.
Keywords: Artificial intelligence, management, university curriculum, competencies

La Inteligencia artificial y la gestión del currículo Universitario por competencias

Resumen: La inteligencia artificial (IA) puede transformar la gestión curricular universitaria por competencias al automatizar la organización, búsqueda y filtrado de recursos educativos. Los recursos proporcionados por las IA ofrecen recomendaciones de contenido personalizadas, facilitando una gestión más eficiente para estudiantes y profesores. La investigación cualitativa, basada en una revisión de diez fuentes referenciales y discusiones de expertos, destacaron la importancia de la personalización del aprendizaje, la mejora de la calidad educativa, la adaptación sociocultural y la participación activa de los estudiantes. Los resultados determinaron que la integración de la IA puede mejorar la programación curricular al ofrecer personalización y evaluación continua, siempre que esté alineada con estos principios. En conclusión, la IA puede enriquecer la educación universitaria al hacerla más dinámica y adaptada a las necesidades individuales y colectivas, facilitando una formación más efectiva   para   el   entorno   laboral   actual.
Palabras clave: Inteligencia artificial, gestión, currículo Universitario, competencias

Inteligência Artificial e o gerenciamento do currículo universitário por competências

Resumo: A inteligência artificial (IA) pode transformar o gerenciamento do currículo universitário automatizando a organização, a pesquisa e a filtragem de recursos educacionais. Os recursos fornecidos pela IA oferecem recomendações personalizadas de conteúdo, facilitando um gerenciamento mais eficiente para alunos e professores. A pesquisa qualitativa, baseada em uma análise de dez fontes de referência e discussões de especialistas, destacou a importância da personalização do aprendizado, da melhoria da qualidade educacional, da adaptação sociocultural e da participação ativa dos alunos. Os resultados determinaram que a integração da IA pode aprimorar a programação curricular ao proporcionar personalização e avaliação contínua, desde que esteja alinhada com esses princípios. Em conclusão, a IA pode enriquecer o ensino universitário, tornando-o mais dinâmico e adaptado às necessidades individuais e coletivas, facilitando um treinamento mais eficaz para o ambiente de trabalho atual.
Palavras-chave: Inteligência artificial, gestão, currículo universitário, competências.

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I. Introduction

AI can play a crucial role in competency-based curriculum management, information management, and content curation by automating the organization, search, and filtering of educational resources. AI-based tools can provide personalized content recommendations and help students and teachers manage information more efficiently. In addition, AI can facilitate the transition to virtual environments by offering adaptive learning platforms that fit individual needs and learning styles, depending on the learning process. Negre , Marin and Perez (2018)

Besides Kolbe (2019) emphasizes the importance of physical infrastructure in the educational process, even in a changing context. Adequate infrastructure is essential to house and preserve pedagogical materials, as well as to provide a safe, comfortable and ergonomic environment for learning. He also highlights the crucial role of family, society and governments in bridging the digital divide and improving connectivity. While physical infrastructure remains important, AI can complement and, in some cases, replace certain aspects of traditional infrastructure. For example, AI-based online learning platforms can offer accessibility to educational resources and remote support, reducing the dependence on physical infrastructure. However, adequate infrastructure remains critical to ensure connectivity and provide a safe and effective learning environment.

AI can enhance these student-centered approaches through adaptive tools that support collaborative work and problem-based learning. For example, AI systems can facilitate the creation of interactive and collaborative learning environments, offering real-time feedback and personalizing learning experiences to individual students' needs. This can improve the effectiveness of the training process and help teachers implement more effective strategies, according to Jiménez, Gonzáles, and Tornel (2020).

Intelligence **(AI)** , which is made up of systems that use databases, algorithms and computing to offer responses similar to human intelligence, has shown great potential in various fields, including education (Luckin et al., 2016). AI is being integrated into almost all areas of knowledge-based value creation and is beginning to have a significant impact in the educational field.

Miao et al. (2021) highlight that AI can facilitate innovative learning, a pressing need in the face of challenges related to poor learning quality. AI is being explored as a tool to gain detailed insights into students, and to collaborate with data and methodologies that can improve teaching and learning. This includes the ability to predict specific student performance and needs.

Impact of AI-powered Competency Management

1.1. Personalization of Learning: The integration of AI into competency-based curriculum programming enables more advanced personalization of learning. AI systems can analyze student performance in real-time and adjust content and activities to meet their individual needs. This is consistent with competency-based planning, which seeks to tailor education to each student's specific abilities and needs, as highlighted above (Kruger et al., 2022). AI's ability to deliver

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Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
==

tailored resources and tasks can improve the effectiveness of curriculum planning by making it more tailored to each student.

1.2. Continuous Assessment and Feedback: AI facilitates the implementation of continuous assessment systems that provide immediate feedback to students. This aligns with the vision of Kruger et al. (2022) and Naidoo (2019) on the need for assessment and monitoring mechanisms that enable continuous improvement in educational quality. AI's ability to perform detailed assessments and offer real-time feedback can optimize the way competencies are measured and managed, making the process more dynamic and effective.

1.3. Adaptation to the Sociocultural Environment: The implementation of AI in competency-based management can offer tools to adapt educational content and methods to specific sociocultural contexts. Although AI can help personalize learning, it must also be designed with sensitivity to cultural particularities, as mentioned by García (2021) and Uribe- Munante and Flores-Sotelo (2022). AI can facilitate the integration of these considerations into the curriculum, but its effectiveness will depend on how it is configured to respect and adapt to diverse sociocultural contexts.

1.4. Student Engagement and Participation: AI can transform the way students interact with the curriculum, promoting more active participation through the use of interactive and adaptive learning platforms. This resonates with the emphasis on organizational culture and the participation of educational actors pointed out by García (2021) and Rodríguez-Gallego et al. (2020). AI tools can foster more autonomous and participatory learning, supporting student involvement in their educational process.

II. Methodology

The research had a qualitative approach, of the descriptive research type on documentary information from ten reference sources, with the discussion group technique for competency management in the programming of curricular experiences at the university through the use of artificial intelligence (AI).

Some discussions were carried out in the group of three experts knowledgeable in the respective topic and discussed documentary information from ten referential sources, whose identifications are reserved. The discussions revolved around the Focus on Personalization of Learning, Improvement of Educational Quality, Adaptation to the Sociocultural Environment and Involvement and Participation of Students; some reference authors were used, being the relevant ideas based on the documents indicated in the section on Results

III. Results

After the group of three experts knowledgeable in the respective topic has discussed the documentary information from ten referential sources, with the focus group technique for competency-based management in the programming of curricular experiences in the university through the use of artificial intelligence (AI), the following results have been reached:

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Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
==

3.1. For the focus on Learning Personalization: The contributions of Luckin et al. (2016) and Miao et al. (2021) recognize that AI can revolutionize education by offering responses and solutions tailored to individual student needs. This personalization approach aligns with competency-based planning, which seeks to tailor education to each student's particular abilities and needs (Kruger et al., 2022). AI can enhance this approach by providing accurate, real-time data on student performance and areas for improvement.

3.2. To Improve Educational Quality: The ability of AI to facilitate innovative learning and improve educational quality, according to Miao et al. (2021), was considered to be in line with the need to continuously evaluate and adjust the educational process, as suggested by Kruger et al. (2022) and Naidoo (2019). AI can provide tools for more dynamic and continuous assessment, helping to address issues related to low learning quality.

3.3. For Adaptation to the Sociocultural Environment: The contributions of Luckin et al. (2016) and Miao et al. (2021) who mainly focus on the technical and pedagogical capabilities of AI, adaptation to the sociocultural environment remains crucial. García (2021) and Uribe- Munante and Flores-Sotelo (2022) emphasize the importance of considering the sociocultural context in school management. The implementation of AI must be sensitive to these factors to be effective in diverse contexts, ensuring that the technology adapts to the cultural and social particularities of students.

3. 4. For Student Involvement and Participation: It was considered that AI's ability to provide detailed data about students can foster greater involvement and participation in the educational process, as suggested by García (2021) and Rodríguez-Gallego et al. (2020). AI can support more autonomous and engaged learning, by offering personalized educational experiences that motivate students to actively participate in their own learning.
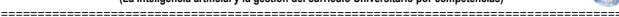
From the information discussed it can be deduced that :

The incorporation of AI into competency-based management has the potential to significantly improve the programming of curricular experiences at the university, offering personalization, continuous assessment and adaptability. However, to be effective, it must be aligned with the principles of sociocultural adaptation and active participation, as suggested by previous authors. The key will be to integrate technology in a way that complements and enriches existing educational   practices.
Furthermore, competency-based planning at the university offers a methodology that is in line with best practices in school management, such as those described by the authors mentioned above. It facilitates an education that is more adapted to the real needs of students and the sociocultural environment, encourages continuous assessment and improves student participation and commitment, thus reflecting an evolution in curricular planning that seeks more relevant and effective training.

IV. Discussion

The implementation of AI in competency-based curriculum programming can enrich and modernize the educational process. While the approaches proposed by Jiménez, Gonzáles, and

Vol.3 Núm.1(2023), GESTIONES - Revista Avanzada © Investigación de Estudios Avanzados ISSN: 3028-9408 https://gestiones.pe/index.php/revista

Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
==

Tornel (2020) are not sufficient, although Kolbe (2019) underlines the importance of physical infrastructure, AI can provide complementary solutions that expand access to education and improve learning management, although it does not replace the need for adequate infrastructure. Combining emerging technologies with modern pedagogical practices can offer a more dynamic, efficient and adapted education to current needs.

Comparison with the Authors mentioned in the Introduction section:

4.1. Comprehensive Approach and Adaptation: Kruger et al. (2022) emphasize the importance of comprehensive training and adaptation to the sociocultural environment. AI can enhance this adaptation by providing tools to personalize learning and adjust content to students' needs, although its effectiveness will depend on the quality and sensitivity of the algorithms used.

4.2. Continuous Assessment and Improvement: Continuous assessment and improvement are key aspects according to Naidoo (2019) and Kruger et al. (2022). AI can offer more accurate and flexible assessment systems, providing immediate feedback that allows adjustments to the educational process in real time, thus improving educational quality.

4.3. Organizational Culture and Engagement: Organizational culture and the involvement of educational stakeholders, as indicated by García (2021) and Rodríguez-Gallego et al. (2020), are fundamental aspects for effective school management. AI can support active participation and engagement by offering more tailored and personalized educational experiences, although it is crucial that this technology is implemented in a way that respects and fosters the existing organizational culture.

Furthermore, its importance is discussed and compared with the perspectives of the authors previously mentioned in the Introduction section:

1. Comprehensive Student Development **:** Competency-based planning focuses on the comprehensive development of students, including cognitive, practical, and social skills. This approach seeks not only to transmit knowledge, but also to develop skills that allow students to solve problems and adapt to different work and personal situations. This is aligned with what Kruger et al. (2022) mentioned, who highlight that school management should promote the comprehensive development of students, indicating that curricular planning should prepare students to be able to face various challenges.
2. Adaptation to the Sociocultural Environment **:** Competency-based planning considers the sociocultural context in which students operate. This involves designing curricula that respond to the specific needs and characteristics of students, which aligns with the need to adapt school management to the sociocultural environment and respect local customs mentioned by García (2021) and Uribe- Munante and Flores-Sotelo (2022). Competency-based planning allows for a personalization of learning that respects and takes advantage of the cultural and social diversity of students.
3. Continuous Improvement and Assessment **:** Competency-based planning facilitates ongoing assessment based on real results, rather than traditional theoretical tests. This methodology fosters continuous improvement by allowing for constant evaluation of student progress in relation to specific skills. This is in line with the approach of Kruger et

Vol.3 Núm.1(2023), GESTIONES - Revista Avanzada © Investigación de Estudios Avanzados ISSN: 3028-9408 https://gestiones.pe/index.php/revista

Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
===

al. (2022) and Naidoo (2019), who highlight the importance of implementing assessment and monitoring mechanisms to improve educational quality and make informed decisions.

4. Participation and Engagement **:** Competency-based planning promotes the active participation of students in their own learning and in the educational process in general. This is reflected in the organizational culture, which should encourage the involvement of educational actors and commitment, as pointed out by García (2021) and Rodríguez-Gallego et al. (2020). A competency-based approach encourages students to take a more active role in their education, which can increase their motivation and commitment.

Compared to other research, such as:

With Quispe's studies, RLR (2022) addressed how to evaluate job performance and human interrelations in a university environment. The questionnaire proposal focuses on measuring these aspects to improve administrative management and the work environment; the contribution corresponds to the Design of Intelligent Surveys by Implementing AI systems to design more dynamic and adaptive surveys that adjust the questions based on previous responses.

Regarding Metadata, health system and pension regimes of Peruvian artists in the context of Covid-19 mentioned by Villanueva M and Torres N (2021), data and metadata management is relevant and will allow the integration of courses on the use of AI in the management and analysis of metadata, focusing on its application in health and pensions.

The training of university students in curricular programs with a competency-based curriculum approach will be more likely to achieve emotional balance and resolution strategies in management as indicated by Páucar E, Torres N, Montejo C (2021) by incorporating AI tools that offer support for emotional balance and stress management in the university environment, facilitating conflict resolution by developing educational modules on the use of AI in mediation and conflict resolution, providing simulations and tools for practice.

Likewise, AI will allow administrative management and teaching practice in a public educational institution, as indicated by Fernández V (2021) when mentioning the relationship between administrative management and teaching practice in an educational institution, highlighting the need for efficient management to improve educational results; in this sense, it will be necessary to incorporate AI in the administrative management of educational institutions to optimize processes and resources and for Teaching Practices by using AI to develop tools that help in the planning and evaluation of teaching practices, improving educational quality.

V. Conclusion

AI has the potential to significantly improve curriculum programming and educational quality by offering personalization, continuous assessment, and solutions tailored to students' needs. This approach is in line with ideas about competency-based planning and school management, although it is essential to integrate AI in a way that respects and adapts to the sociocultural context of students. University curriculum programming can greatly benefit from the integration of AI, providing a richer, more dynamic educational experience tailored to the individual and
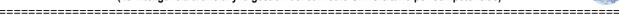
Vol.3 Núm.1(2023), GESTIONES - Revista Avanzada © Investigación de Estudios Avanzados ISSN: 3028-9408 https://gestiones.pe/index.php/revista

Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
==

collective needs of students. The application of smart technologies can facilitate more effective training and preparation for today's work environment.

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Vol.3 Núm.1(2023), GESTIONES - Revista Avanzada © Investigación de Estudios Avanzados ISSN: 3028-9408 https://gestiones.pe/index.php/revista

Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
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Vol.3 Núm.1(2023), GESTIONES - Revista Avanzada © Investigación de Estudios Avanzados ISSN: 3028-9408 https://gestiones.pe/index.php/revista

Artificial Intelligence and the management of the University curriculum by competencies
(La Inteligencia artificial y la gestión del currículo Universitario por competencias)
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