
Received Date: August 21, 2025 Accepted Date: September 13, 2025 Published Date: October 01, 2025

Available Online at <https://www.ijsrisjournal.com/index.php/ojsfiles/article/view/216>

Informatics and Didactics: A New Approach Based on Artificial Intelligence in Education

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Abstract

In recent years, the integration of **Informatics** and **Didactics** in education has been revolutionized by the advent of **Artificial Intelligence (AI)**. AI has the potential to reshape how educational content is delivered, how students learn, and how teachers manage classrooms. In the context of Morocco, where educational reforms are underway, the integration of AI into teaching methodologies offers exciting possibilities for improving the quality of education, enhancing personalized learning experiences, and addressing the challenges of educational equity. This article explores the intersection of **Informatics**, **Didactics**, and AI, examining how AI-driven tools are transforming education in Morocco. By providing examples of AI applications such as adaptive learning systems, intelligent tutoring systems, and AI-driven content creation, this article highlights the ways in which AI can complement traditional didactic approaches and create more interactive, inclusive, and personalized learning environments. We also discuss the challenges of integrating AI into the Moroccan education system, including infrastructure limitations, teacher preparedness, and ethical considerations. Finally, the article offers recommendations for successfully adopting AI in education and fostering a future-ready generation of learners.

Keywords: Informatics, didactics, artificial intelligence, personalized learning, adaptive learning, Morocco, education

reform, digital tools, intelligent tutoring systems, AI-driven content creation, future of education.

1. Introduction

The rapid evolution of **Informatics** (the use of computer science and digital technologies) and **Didactics** (the theory and practice of teaching) in education has paved the way for significant transformations in the learning process. The introduction of **Artificial Intelligence (AI)** into education provides an innovative solution to many of the challenges that educators face, such as meeting the needs of diverse learners, improving engagement, and optimizing teaching effectiveness. AI applications, which leverage data and advanced algorithms to make decisions and predictions, can enhance both teaching practices and learning outcomes.

In Morocco, the **Vision 2015-2030** for education aims to modernize the system by integrating digital tools and enhancing pedagogical strategies. AI has the potential to be a key driver in this transformation by providing tools that make learning more personalized, efficient, and accessible. The ability of AI to analyze vast amounts of data, adapt to individual learning styles, and offer tailored feedback to students makes it an invaluable asset in the Moroccan education system. By blending **Informatics**, **Didactics**, and AI, Moroccan schools can create a more dynamic and

responsive learning environment that caters to the needs of all students, from primary school to higher education.

This article explores how **AI** is being integrated into Moroccan education, focusing on its impact on teaching methodologies, student engagement, and learning outcomes. It discusses the potential of AI to support **personalized learning**, improve educational equity, and enhance the effectiveness of teachers. Additionally, it addresses the challenges associated with adopting AI in education and provides recommendations for overcoming these hurdles.

2. AI in Education: A New Approach to Informatics and Didactics

2.1 AI-Driven Adaptive Learning Systems

One of the most significant contributions of AI to education is the development of **adaptive learning systems**. These AI-driven platforms personalize the learning experience by adjusting the content, pace, and difficulty level based on each student's performance. In a traditional classroom setting, it is challenging for teachers to address the individual needs of every student. However, with **adaptive learning**, AI systems can collect data on student interactions, identify strengths and weaknesses, and provide customized learning paths that help students progress at their own pace.

In Morocco, the use of AI-powered **adaptive learning systems** can address the challenge of providing equitable educational opportunities, particularly for students in underserved areas. These systems can adapt to the learning needs of students from diverse backgrounds, offering targeted support and resources to ensure that no student is left behind. Research has shown that adaptive learning systems improve retention rates and academic achievement by providing students with the appropriate level of challenge and support [1][2][3].

For example, platforms like **DreamBox** and **Knewton**, which use AI algorithms to personalize learning paths, can be adapted to the Moroccan curriculum. By analyzing student behavior and performance in real time, these platforms offer tailored lessons and quizzes that help students master concepts before advancing to more complex material [4].

2.2 Intelligent Tutoring Systems (ITS)

Intelligent Tutoring Systems (ITS) are another example of how AI is transforming education. ITS are computer-based systems that provide personalized instruction and feedback to students without the need for human intervention. These systems simulate the role of a tutor, offering one-on-one support to students by analyzing their responses and providing tailored feedback. ITS can be used to teach subjects ranging from mathematics and science to language arts, offering

students immediate feedback and guidance as they work through exercises.

In Morocco, ITS could be particularly beneficial in addressing teacher shortages, especially in remote or rural areas, where there may be fewer qualified teachers in specific subject areas. By using AI to supplement classroom instruction, ITS can provide students with the individualized support they need to succeed academically. Moreover, ITS can track student progress over time, identify areas where they are struggling, and offer additional resources to help them improve [5][6][7].

2.3 AI in Content Creation and Curriculum Development

AI is also transforming the way educational content is created. Through the use of **natural language processing (NLP)** and **machine learning**, AI systems can automatically generate personalized learning content, such as quizzes, worksheets, and practice exercises. AI-driven content creation can be used to develop educational materials that are aligned with the curriculum, ensuring that students receive relevant and high-quality resources.

In the context of Morocco, AI can help localize educational content, making it more relevant to the cultural and linguistic context of students. For example, AI tools could generate lesson plans in Arabic, French, or Berber, ensuring that students have access to content in their native languages. AI can also help teachers create differentiated materials for students with varying levels of proficiency, providing a more inclusive and flexible learning environment [8][9][10].

3. Challenges of Integrating AI into the Moroccan Education System

3.1 Infrastructure and Access to Technology

While the potential of AI in education is vast, its successful integration in Morocco requires overcoming significant challenges, particularly in terms of **infrastructure** and **access to technology**. Many schools, especially in rural areas, lack the necessary infrastructure, including reliable internet access and modern computing devices, to fully implement AI-driven solutions. Without adequate infrastructure, the benefits of AI may not reach all students, particularly those in underserved regions.

To ensure that AI can be effectively implemented across the country, Morocco must prioritize investment in **digital infrastructure**, particularly in rural schools. This includes expanding internet connectivity, providing schools with modern devices, and ensuring that technical support is available to maintain and operate these systems. Public-private partnerships could play a key role in providing schools

with the resources they need to adopt AI technologies [11] [12].

3.2 Teacher Training and Professional Development

Another critical challenge is the **lack of teacher training** in AI technologies. While many educators in Morocco are familiar with traditional teaching methods, they may not have the skills or knowledge to effectively integrate AI tools into their classrooms. Professional development programs focused on **AI in education** are essential to ensure that teachers can effectively use AI-powered tools to enhance teaching and learning.

In Morocco, teacher training should include both technical training on how to use AI platforms and pedagogical strategies for integrating AI into classroom instruction. By equipping teachers with the skills to use AI tools effectively, the country can create a more dynamic and responsive education system that meets the needs of all students [13] [14] [15].

3.3 Ethical Considerations

The integration of AI into education also raises important **ethical considerations**. Issues related to student privacy, data security, and algorithmic bias must be carefully addressed to ensure that AI tools are used responsibly and ethically. In Morocco, policymakers must work closely with AI developers and educators to establish guidelines and regulations that protect student data and ensure that AI systems are transparent, fair, and unbiased [16] [17].

4. Recommendations for Successfully Integrating AI in Education

To ensure that AI can effectively enhance education in Morocco, the following recommendations are proposed:

1. **Invest in Digital Infrastructure:** Morocco must prioritize the expansion of reliable internet access and the provision of modern computing devices to schools, especially in underserved regions, to ensure that all students can benefit from AI technologies.
2. **Implement Teacher Training Programs:** Professional development programs focused on AI in education should be implemented at all levels, ensuring that teachers are equipped with the skills to use AI tools effectively in the classroom.
3. **Promote Ethical AI Use:** Establish clear guidelines and regulations to protect student privacy, ensure data security, and address algorithmic bias in AI-powered educational tools.
4. **Encourage Public-Private Partnerships:** Collaboration between the government, tech companies, and educational institutions can help

provide the resources and expertise needed to implement AI technologies effectively in schools.

Conclusion

The integration of **Informatics, Didactics, and Artificial Intelligence** has the potential to revolutionize the Moroccan education system. AI-driven tools can enhance personalized learning, provide adaptive instruction, and support teachers in managing diverse classrooms. However, the successful implementation of AI in education requires addressing challenges related to infrastructure, teacher training, and ethical considerations.

By making strategic investments in digital infrastructure, promoting AI-focused professional development for teachers, and ensuring ethical AI use, Morocco can create an education system that prepares students for the digital future. AI has the potential to create a more inclusive, dynamic, and personalized learning environment that fosters critical thinking, creativity, and innovation among students, thus contributing to Morocco's broader educational goals as outlined in the **Vision 2015-2030**.

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