



The Future of Artificial Intelligence in Education in Morocco: Challenges and Perspectives

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Abstract

Original Research Article

Artificial Intelligence (AI) is reshaping nearly every sector, and education is no exception. Its integration has transformed how learning is delivered, assessed, and managed. AI supports students and educators by enhancing the quality of instruction, optimizing administrative work, and providing innovative tools for learning. Research consistently shows that AI improves educational efficiency and provides rich learning resources. However, concerns remain regarding reduced student–teacher interaction and potential threats to academic integrity. Therefore, while AI inspires optimism, it also calls for responsible and cautious implementation.

Within the field of English as a Foreign Language (EFL), AI-driven tools have become powerful aids to language learning. In Morocco, the demand for English proficiency has grown considerably due to globalization and the increasing importance of English in international communication, trade, and academia. Yet, the introduction of AI into Moroccan education involves unique cultural, socio-economic, and pedagogical dimensions.

Keywords: AI implementation, language teaching, pedagogy and outcomes, learner and teacher perception.

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1. Introduction :

Artificial Intelligence (AI) has emerged as one of the most transformative technological developments of the twenty-first century. Its sophisticated applications are used in numerous sectors, including healthcare, finance, transportation, and increasingly, education. Within the educational field, AI is reshaping how learning is delivered, assessed, and managed by introducing new forms of personalized instruction, automated feedback systems, and data-driven pedagogical strategies.

Recent studies suggest that AI technologies can improve the efficiency and effectiveness of educational systems by supporting individualized learning pathways, reducing administrative burdens for educators, and expanding access to learning resources (Crompton & Burke, 2023). AI-powered systems and tools can analyze learner data, suggest adapted instructional content in real time, and provide immediate feedback that supports continuous learning. While these capabilities have generated considerable optimism regarding AI's potential to transform educational practices,



the rapid integration of AI into education has also stirred serious pedagogical, ethical, and institutional concerns. Critics point to risks such as reduced human interaction in learning environments, overreliance on automated systems, and potential threats to academic integrity. Furthermore, unequal access to technological resources may exacerbate existing educational inequalities. As a result, the adoption of AI in education requires a balanced and cautious approach that considers both its opportunities and harness its limitations.

Within the context of English as a Foreign Language (EFL) learning, AI technologies have become particularly influential. Language learning applications, intelligent tutoring systems, and speech-recognition tools have expanded opportunities for students to practice language skills beyond traditional classroom settings. In Morocco, the demand for English proficiency has increased significantly due to globalization, international trade, and the growing role of English in academic and professional communication. also

Despite these developments, the integration of AI into Moroccan education is still at its early stages as specific socio-economic, cultural, and pedagogical factors hinder its development on a large scale. This paper discusses how Moroccan EFL learners and teachers perceive AI-based learning tools, the wide opportunities these technologies offer, and the challenges and limitations associated with their implementation. These challenges reveal a marking discrepancy in the timeline. While AI technologies are evolving daily, educational policies are moving at a much slower pace. As an example, though ChatGPT was first released in 2022, many teachers still continue to assign written work without any significant change to adapt to the possibility that students might use AI to do all the work .Moroccan students systematically use AI tools outside of conventional classroom settings because AI integration is still disallowed in the main educational curricula in both secondary and higher education (Telquel, 2025). In a typical Moroccan classroom, you find every student with an AI companion. According to Hesperess (2024), a recent survey in Morocco reveals that ChatGPT is very popular among students, with

85% reporting they use it for tasks like translating, drafting essays, requesting text improvements, or gathering information, suggesting widespread informal adoption.

By analyzing current practices and learner perspectives, this paper aims also to contribute to a broader understanding of how AI may change language education in Morocco.

2. Artificial Intelligence and Educational Innovation :

The concept of Artificial Intelligence dates back to the mid-twentieth century, when researchers began exploring the possibility of machines capable of performing tasks traditionally associated with human intelligence. The term Artificial Intelligence was formally introduced during the 1956 Dartmouth Conference by John McCarthy, marking the beginning of AI as an academic field (Norvig, 2016).

Since then, AI systems definition and capabilities have expanded due to fast technological progress in computing power, data availability, and machine learning algorithms. Contemporary definitions describe AI as computational systems capable of performing cognitive tasks such as learning, reasoning, adapting, and making decisions based on complex data analysis (Popenici & Kerr, 2017).

A more recent definition describes AI as 'computing systems that can engage in human-like processes such as learning, adapting, synthesizing, self-correction, and the use of data for complex processing tasks' (Popenici & Kerr, 2017). Crompton et al. (2020) argue that AI is significantly emerging in education thanks to its potential to enhance teaching and learning at all educational levels. It is being applied to improve efficiency in various educational practices, such as profiling, intelligent tutoring, assessment, evaluation, adaptive systems, and personalization (Zuboff, 2023).

In recent years, AI has become increasingly prominent in higher education due to its capacity to improve learning outcomes and optimize institutional processes (Crompton & Burke, 2023). Educational applications of AI typically include:

Learning analytics and predictive modeling, which allows institutions to anticipate student performance and identify at-risk learners.

Intelligent tutoring systems, capable of providing personalized instructional support.

Automated assessment systems, which streamlines grading and feedback processes.

Adaptive learning platforms, which dynamically provides educational content according to individual learning needs.

These technologies and others lead to a data-driven education, where teaching and learning strategies are informed by detailed analysis of learner behavior and performance.

3. Digital Transformation of Education in Morocco :

The integration of AI technologies into Moroccan education must be understood within the broader context of the country's digital transformation efforts. Government initiatives such as the Maroc Digital 2030 strategy have aimed to modernize national infrastructure, expand internet access, and promote the use of digital technologies across various sectors.

Recent statistics indicate that internet penetration in Morocco exceeds 80 percent, providing an essential foundation for the development of digital learning environments. Universities and educational institutions have begun experimenting with digital platforms, online learning systems, and technology-enhanced classrooms. (Njoya, S. 2025, March 27).

The COVID-19 pandemic further accelerated this digital shift by forcing educational institutions to adopt remote learning technologies without being prepared. Online platforms and digital resources became essential tools for maintaining educational continuity during periods of lockdown. This transition witnessed a plethora of challenges. Therefore the integration of advanced technologies such as AI remains uneven. Significant disparities exist between urban and rural areas in terms of technological infrastructure, access to devices, and digital literacy. Moreover, many educators have not yet received adequate training on how to pedagogically and efficiently implement AI

tools. These challenges highlight the importance of developing coherent national strategies for integrating AI into education while ensuring equitable access to digital resources.

4. AI Applications in Moroccan EFL Classrooms :

In Morocco, English is introduced as a foreign language at the middle-school level, and traditional instructional methods—such as textbook-based learning and teacher-centered instruction—remain dominant. However, AI-powered tools are increasingly used to supplement these traditional approaches and expand opportunities for language practice. In this regard, several categories of AI tools have gained popularity among Moroccan learners. Applications such as Duolingo, Babbel, and Memrise employ machine learning algorithms to personalize language instruction. These platforms adapt lesson difficulty according to learner performance and incorporate gamified elements to maintain learner motivation.

As for AI-Based Writing Assistants, tools such as Grammarly provide real-time feedback on grammar, punctuation, and stylistic issues. By analyzing written text, these systems help learners refine their writing skills and improve linguistic accuracy.

Speech recognition systems allow learners to practice pronunciation and receive immediate feedback. Technologies such as Google Voice Recognition support oral language practice and facilitate the development of listening and speaking skills.

Digital tutoring platforms such as Cambly and Preply offer flexible opportunities for conversational practice. These platforms combine human tutoring with AI-assisted matching systems that connect learners with instructors according to their learning objectives.

5. Learner Perceptions of AI-Based Language Learning :

Qualitative feedback from Moroccan EFL learners indicates that AI technologies are generally perceived positively, although certain concerns remain. Several key benefits emerge

from learner experience. (Daife, Y., & Elharbaoui, E. 2025).

Personalized Learning Experiences :

One of the most frequently cited benefits of AI tools is their ability to suggest adapted learning content to individual learner needs. Adaptive learning algorithms analyze learner performance and adjust lesson difficulty accordingly, enabling students to progress at their own pace. This increases motivation and engagement. Personalized Instruction helps in the development of individualized learning pathways that account for each student's learning pace, strengths, and weaknesses.

Expanded Opportunities for Language Practice :

AI tools provide learners with many opportunities to practice English outside the classroom environment. For many Moroccan students, particularly those with limited exposure to English in daily life, conversational bots and speech-recognition tools offer valuable opportunities to develop communication skills.

Flexibility and Autonomous Learning :

AI-based learning platforms allow students to access educational content at any time and from any location. This flexibility is particularly valuable for learners who must balance academic responsibilities with work or other obligations. (ESCWA, 2024).

6. Educational Benefits of Artificial Intelligence :

The integration of AI into educational systems offers several significant advantages.

Interactive and Immersive Learning :

Technologies such as virtual reality (VR) and augmented reality (AR) create immersive educational environments that enhance experiential learning.

Improved Learning Analytics :

AI-driven analytics allow educators to monitor student progress in real time and identify learning difficulties early.

Institutional Efficiency :

Automated administrative systems can reduce educator workload by streamlining tasks such as grading, scheduling, and data management.

Enhanced Educational Accessibility :

AI technologies can support inclusive education through assistive tools such as speech-to-text systems, real-time translation, and adaptive learning interfaces for students with disabilities.

7. Challenges and Limitations :

Despite its existing and potential benefits, the implementation of AI in education faces several important challenges. In this sense, educators have been warned against showing overly optimistic claims regarding AI. Instead, educators, researchers, and policymakers were advised to approach AI with skepticism and critical awareness (Selwyn, 2022); in Morocco, for instance, a recent study of 237 public school teachers in the Fez-Meknes region revealed that while many hold positive attitudes toward AI, more than half reported limited knowledge of AI concepts and tools, highlighting a cautious and uneven adoption process (Fakhar et al., 2024). The challenges and limitations include:

Digital Inequality :

Unequal access to digital infrastructure remains a major barrier, particularly in rural areas where reliable internet access and technological resources may be limited.

Overdependence on Technology :

Excessive reliance on AI tools diminishes learners' critical thinking abilities and discourages independent problem-solving.

Cultural and Contextual Limitations :

Many AI-based learning systems are designed primarily for global audiences and may lack cultural relevance for Moroccan learners.

Resistance from Educators :

Some educators express concerns regarding the potential displacement of teachers by AI technologies. Additionally, many teachers still need adequate training to effectively integrate AI tools into classroom instruction. *Without structured support and training, AI adoption will remain uneven, with some teachers adopting it while others will avoid embracing it.* (Langreo, L. 2023).

Ethical and Privacy Concerns :

AI systems often rely on large amounts of personal data, which raises concerns regarding privacy protection, data security, and algorithmic bias.

8. Ethical Considerations and Governance :

Obviously, the ethical implications of AI in education have become a central issue in contemporary educational debates. This is not new as with previous technological revolutions, the implementation of AI has raised concerns regarding job displacement and social disruption.

Nevertheless, historical experience suggests that technological innovations typically transform professional roles rather than eliminate them. In the context of education, AI should therefore be viewed as a complementary tool that supports, rather than replaces human educators.

Educational institutions must develop governance frameworks that address issues such as data privacy, algorithmic transparency, and responsible use of AI technologies. Ensuring equitable access to AI-based educational tools will also be critical in preventing new forms of digital divide.

9. Strategies for Effective Implementation :

For AI technologies to effectively support education, institutions must adopt strategic implementation frameworks. (Jhuree, et al 2024). Key policy priorities include :

Teacher training and professional development to ensure educators can effectively integrate AI tools into their pedagogical practices.

Investment in digital infrastructure, particularly in underprivileged areas.

Continuous evaluation and monitoring of AI systems to evaluate their impact on learning outcomes.

Promotion of human-centered skills, including creativity, critical thinking, and empathy.

These competencies will become increasingly important in an AI-driven society where technological capabilities continue to expand.

10. Future Prospects for AI in Moroccan Education :

The future of AI in Moroccan education appears promising but will depend largely on policy choices, institutional readiness, and investment in digital infrastructure. In the field of EFL education, AI technologies have the potential to significantly enhance language instruction through personalized instruction, interactive learning environments, and expanded access to practice opportunities. (Selwyn. 2022)

However, achieving these benefits will require collaboration between government authorities, educational institutions, technology developers, and educators. It is also vital to develop AI tools that reflect Moroccan cultural contexts and linguistic realities. This will be essential in ensuring effective learning outcomes.

11. Conclusion :

Artificial Intelligence is rapidly transforming educational systems worldwide, offering new opportunities for personalized learning, increased accessibility, and improved instructional efficiency.

For Moroccan EFL learners, AI technologies provide valuable tools for enhancing language acquisition through flexible and interactive learning environments. Nevertheless, challenges such as unequal access to technology, digital literacy inequalities, and ethical concerns must be addressed to ensure responsible integration.

The challenge that remains now is how to use AI technologies in our educational institutions. Teachers who were once the source of knowledge are no longer the authority. Currently they are discovering and learning how to use AI along their students and in many cases, teachers and schools are lagging behind their students. The future of AI in Moroccan education will depend on the ability of policymakers and educators to strike the right balance between technological innovation and pedagogical integrity. As technology evolves, it is imperative to keep an open mind and stay updated. When implemented thoughtfully, AI can contribute to the development of an educational system that is both technologically advanced and deeply human-centered.

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