Chapter 1
Education Divide and Technology:
Can Artificial Intelligence Build More Equitable Learning?

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ABSTRACT

Although education is a key factor in achieving sustainable development, global inequalities in access and quality of education persist as major challenges. The education divide - the disparity in access to learning opportunities - is exacerbated by economic, technological and geographical factors, and particularly affects vulnerable communities. Artificial intelligence (AI) has emerged as a potential tool to reduce these inequalities, offering adaptive models that personalise instruction, optimise resources and promote educational equity. This chapter examines the role of AI in sustainable education, focusing on bridging the education divide through adaptive models. It explores innovative applications of AI in education, its advantages and challenges, and possible solutions so that integration into education systems is done ethically and avoids increasing discrimination.

DOI: 10.4018/979-8-3373-2802-7.ch001

INTRODUCTION

The implementation of artificial intelligence in the educational sector has the potential to significantly change the teaching and learning process. Adaptive AI models are built on algorithms that can quickly process large amounts of data and make decisions based on previous experience (Grassini, 2023). Technology has thus enabled the development of systems that allow for the personalization of material, rhythm, and level of difficulty according to each student's performance and learning style, improving inclusivity and knowledge retention (Slimi & Carballido, 2023). Luckin et al. (2016) have shown that AI systems can act as educational mediators by responding to the student's cognitive and emotional profile, resulting in more meaningful and engaging learning experiences.

One of the most significant applications of AI in the field of education is the development of intelligent tutoring systems, which simulate interactions with teachers. These systems can provide immediate feedback, identify misunderstandings, and suggest personalized learning exercises (Graesser et al., 2018). Likewise, AI allows teachers to obtain real-time analytical data on student development, resulting in more effective and evidence-based pedagogical intervention (Mohammed & Watson, 2019). These capabilities open up new options for improving quality, personalization, and equity in education. AI applications in education include virtual assistants and intelligent tutoring systems, as well as adaptive learning platforms that respond to student demands in real time. These technologies allow the content, pace, and difficulty level of activities to be adapted to suit each student's performance and learning style, thereby facilitating knowledge acquisition and enhancing quality (Zawacki-Richter et al., 2019). Apps can also automate administrative and assessment work, allowing teachers to focus on more pedagogically valuable activities (Cardona et al., 2023). Furthermore, in situations where connectivity is limited or there is a shortage of teaching professionals, AI can serve as a complementary solution to ensure access to quality content.

However, the implementation of these technologies must be followed by a rigorous examination of their ethical consequences, which include, among other things, data privacy issues, discriminatory biases, and the depersonalization of the educational process (Bozkurt, 2023; Ntoutsi et al., 2020). Furthermore, in this period of increasing global digitization, education faces a paradox: although technology provides new opportunities to democratize access to information, it also risks exacerbating disparities (Warschauer, 2004). The digital divide, defined as disparities in access, use, and appropriation of digital technology, is a structural impediment to the positive influence of digitalization on education systems. This disparity is visible not just in the availability of resources such as infrastructure and gadgets,

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