# Chapter 2
# Artificial Intelligence in Education:
## An Evaluation of Four Decades

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## ABSTRACT

*The rapid growth of artificial intelligence (AI) in education presents numerous opportunities and challenges. However, there remains a lack of deep understanding regarding the research landscape, making it challenging for educators, researchers, and policymakers to comprehend AI's potential in learning environments. This scientometric analysis maps the development and trends in AI research in education over the past four decades by identifying key contributors, influential publications, and significant areas of focus. By analyzing citation and publication data, the study highlights the structure of the field through citation analysis and co-authorship networks. Findings indicate a rise in AI-related research, with notable journals such as Education and Information Technologies and Computers and Education, and influential researchers including Hwang and Chen. The study highlights vigorous research activity from Asian institutions, particularly in China and Hong Kong. Focus areas include AI in language learning, adaptive learning, and learner-centered tools.*

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## INTRODUCTION

This chapter is situated within the critical framework established by *The Manifesto for Teaching and Learning in a Time of Generative AI* (GenAI) (Bozkurt et al., 2024), which calls for a reflective, evidence-based, and ethically responsible approach to integrating GenAI in education in the broadest sense. The manifesto emphasizes that GenAI technologies have psychological, social, cultural, economic, and ethical implications. Considering that the current volume is an attempt to move technical perspectives to the transformational potential of GenAI within the scope of critical reflections and goals underlined in the manifesto, the chapter interrogates the role of AI in education. In other words, it examines the trends, opportunities, and challenges of AI in education by applying a structured methodology regarding citation metrics, networks, and thematic clusters. The paper performs mapping the conceptual, intellectual, and social structures which shape the landscape of AI in education by providing empirical evidence that supports the aims of the manifesto. To this end, it is essential to understand the role of education before presenting a theoretical framework, contextualizing the current research, and presenting a background for the current study, as clarified below.

Education has guided humanity since prehistoric times, becoming a bridge between individuals and real life and leading to personal and worldwide development for several reasons. First, education improves and supports the cognitive abilities of individuals (Hanushek & Woessmann, 2012). Studying various subjects, including the knowledge of our world and the world of numbers and languages, helps people effectively use their cognitive abilities and integrate learning into their daily lives. Second, education can significantly increase individuals' self-confidence and self-efficacy (Zimmerman, 1997), encouraging them to plan and organize their lives and take a practical and active part in society. In addition, higher and more qualified education results in a prosperous professional career with a higher income and better living standards (OECD, 2016). Accordingly, it can be stated that economic growth is mainly fuelled by education. It develops the human capital that provides knowledge, skills, and innovative abilities, making humans increasingly productive and flexible in the labor market. Aside from these, education is associated with increasing productivity, and increased innovation reflects economic growth and, thus, a rise in social welfare at both an individual and societal level (Hanushek & Woessmann, 2012). Furthermore, education can reduce social inequality (Chetty et al., 2014) and give everyone equal opportunity, regardless of where one comes from. It is a platform that can bring success through merit and hard work, irrespective of learners' social, cultural, and economic backgrounds. Finally, education is the core of innovation and technological progress, which can equip people with the information to conduct research and create new valuable technologies in resolving

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