Artificial Intelligence in Education I

Editors:
Erol KOÇOĞLU
Şule EGÜZ

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Editors: Prof. Dr. Erol KOÇOĞLU • Assoc. Professor Şule EGÜZ

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PREFACE

Education is more than the transmission of humanity's accumulated knowledge; it is a dynamic process that shapes the ways we think, learn, and make sense of the world. Technological advances throughout history have transformed the structure and functioning of education, and today artificial intelligence has become one of the most comprehensive and defining elements of this transformation. Artificial intelligence is no longer merely a technology that facilitates learning; it is a new paradigm that requires us to rethink the roles of teachers and students, instructional design, access to knowledge, and the very meaning of learning.

The New Paradigm of Education: Artificial Intelligence examines, from a multidimensional perspective, the opportunities artificial intelligence offers in education, the challenges it raises, and the new directions it opens for the future. The book addresses this transformation in five complementary parts.

The first part, "Artificial Intelligence and the Transformation of Education," explores the development of artificial intelligence in education, generative AI tools, intelligent learning environments, personalized learning, and the impact of artificial intelligence on instructional design. The second part, "Teachers and Students in the Age of Artificial Intelligence," focuses on the changing role and competencies of teachers, student autonomy, AI literacy, creativity and art education, and human-centered learning. The third part, "New Educational Practices with Artificial Intelligence," discusses applications ranging from lesson planning and material development to assessment and evaluation, and from academic writing and research to learning analytics, gamification, and simulation. The fourth part, "Ethics, Fairness, and Trust in Education with Artificial Intelligence," addresses the foundations of responsible use, data security and

privacy, academic integrity, algorithmic fairness, transparency, and human oversight. Finally, the fifth part, "Reflections of Artificial Intelligence across Fields of Education," offers new perspectives on interdisciplinary learning, environmental and sustainability education, inclusive education, lifelong learning, and the future of education. Taken as a whole, the book draws particular attention to the importance of using technology consciously, critically, and responsibly.

In the age of artificial intelligence, the fundamental question is not the extent to which technology is used in education, but how it contributes to the quality of learning and to human development. As the teacher's role in guiding students, designing learning, and fostering critical thinking grows stronger, it is increasingly important for students to act as active agents who manage their own learning, question information, and make independent decisions. In this process, safeguarding creativity, human values, ethical reasoning, and human relationships is as much a priority as technological progress itself.

This book seeks to move beyond approaches that either uncritically embrace or entirely reject artificial intelligence, and to contribute to a reassessment of the relationship between technology and people in education. We hope that the studies in this volume will guide researchers, teachers, pre-service teachers, education administrators, and policymakers, and lay the groundwork for new research, practices, and academic collaborations in education.

We sincerely thank all the chapter authors who enriched this work with their knowledge, academic experience, and original contributions, and our publisher for its support throughout the publication process.

October 2026

CHAPTERS AND AUTHORS

Editors: *Prof. Dr. Erol KOÇOĞLU - Assoc. Professor Şule EGÜZ*

Chapter 1: Artificial Intelligence in Education: Development, Transformation, and New Trends

Prof. Dr. Erol KOÇOĞLU, Inönü University
ORCID No: 0000-0003-4595-2892

Dr. Kübra Melis AVCU, Inönü University
ORCID No: 0000-0001-7942-8648

Chapter 2: Generative Artificial Intelligence and Education: From ChatGPT to Next-Generation Learning Tools

Assoc. Professor Yunus Emre AVCI, Siirt University
ORCID No: 0000-0002-1361-1463

Chapter 3: AI-Supported Learning Environments: From Intelligent Systems to Digital Learning Assistants

Assoc. Professor Özcan EKİCİ, Dicle University
ORCID No: 0000-0003-1191-3166

Chapter 4: Instructional Design in AI-Supported Education

Prof. Dr. Özlem ULU KALIN, Artvin Çoruh University
ORCID No: 0000-0001-9317-5261

Chapter 5: The Changing Role of The Teacher in The Age of Artificial Intelligence

Assoc. Professor Fatıma Betül DEMİR EVCİMEN,
Bartın University
ORCID No: 0000-0002-3573-6160

Chapter 6: Artificial Intelligence Literacy: Knowing, Using, and Questioning

Assoc. Professor Ülkü ULUKAYA ÖTELEŞ,
Muş Alparslan University
ORCID No: 0000-0002-5780-2034

Chapter 7: Artificial Intelligence Literacy: Understanding, Using and Questioning
Assoc. Professor Şule EGÜZ, İnönü University
ORCID No: 0000-0002-3633-8957

Research Assistant Hafsa Şehadet FİLİZ, Gaziantep University
ORCID No: 0000-0001-7614-4033

Chapter 8: Artificial Intelligence, Creativity and Art Education: New Opportunities for Production and Learning
Assoc. Professor Şule EGÜZ, İnönü University
ORCID No: 0000-0002-3633-8957

Yunus ŞİMŞEK, İnönü University

Chapter 9: Human-Centred Learning in the Age of Artificial Intelligence: Collaboration, Interaction and New Roles in Learning
Prof. Dr Erol KOÇOĞLU, İnönü University
ORCID No: 0000-0003-4595-2892

Lecturer Latif GÖKALP, Yozgat Bozok University

Independent Researcher Dr. Elnur CAN MUHAMMEDOĞLU

Chapter 10: Activity and Material Design in AI-Supported Educational Applications
Assoc. Professor Arcan AYDEMİR, Artvin Çoruh University
ORCID No: 0000-0001-8110-954X

Chapter 11: Artificial Intelligence-Supported Measurement and Assessment: New Approaches, Opportunities, and Limitations
Assoc. Prof. Sedef SÜER BAYTAK, Dicle University
ORCID No: 0000-0002-1833-9286

Chapter 12: Gamification and Simulation in AI-Supported Education: Interactive Learning Experiences

Assoc. Professor H. Gülhan ORHAN KARSAK,
Kırklareli University
ORCID No: 0000-0001-5927-6341

Research Assistant Derya KARADENİZ, İnönü University
ORCID No: 0000-0002-1495-7896

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CHAPTER 1

ARTIFICIAL INTELLIGENCE IN EDUCATION: DEVELOPMENT, TRANSFORMATION, AND NEW TRENDS

Prof. Dr. Erol KOÇOĞLU, İnönü University
ORCID No: 0000-0003-4595-2892

Dr. Kübra Melis AVCU, İnönü University
ORCID No: 0000-0001-7942-8648

Introduction

Artificial intelligence (AI) should not be seen only as a new tool in the historical development of educational technologies. It represents a change that makes people question common ideas about teaching, learning, and educational management. The use of artificial intelligence in education is not new. Intelligent tutoring systems and adaptive learning environments are early examples of this. However, with the spread of generative artificial intelligence tools, the areas of use have become wider. Teacher roles, assessment, and equality in education have become more important topics (Wang et al., 2024; Mustafa et al., 2024). In early studies, the contribution of educators was limited, but recent studies emphasize that teachers, students, and institutions should be considered together (Zawacki-Richter et al., 2019; Bond et al., 2024).