Chapter 1
The Changing Roles of Teachers With AI

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ABSTRACT

Artificial intelligence (AI) is ubiquitous in our lives and is progressing at an accelerated rate in the past 60 years. AI application is diverse and AI technology continues to grow. It enables a machine to think like human beings and has opened a new horizon for industries, businesses, transportation, hospitals, and schools. How is AI applied to educational settings? How will the emergence of AI technology assist teachers' teaching and improve students' learning? Will the implementation of AI technology in education replace schoolteachers? What would be the ethical concerns of AI technology? What role do teachers play with AI in education? The purpose of this chapter is to explore the roles that teachers play in the innovation and evolution of AI and to seek approaches teachers should take in coping with AI technology. Issues and problems of teaching with AI will be discussed; solutions will be recommended.

INTRODUCTION

Artificial Intelligence (AI) is omnipresent in our lives and is progressing efficiently in modern world. The beginning of AI can be traced to the 1956 Dartmouth summer research project on Artificial Intelligence initiated by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon (McCarthy, Minky, Rochester, & Shannon, 2006). Today, AI work is performed in detecting cancer, reducing the risk of airplane collisions, and developing autonomous vehicles, etc. AI-equipped robots have outperformed human surgeons in sewing up cuts; performing search and rescuing missions; providing care for children, seniors, and hospital patients; assisting credit card companies with fraud detection; and assisting Apple's Siri, Microsoft's Cortana, and Amazon's Alexia to learn users' behaviors to better serve their customers (Etzioni & Etzioni, 2017).

AI technology has been applied to education in the recent two decades. The Intelligent Tutoring Systems (ITS) cover all major AI topics (e.g., knowledge representation, machine learning, natural language, planning, reasoning, explanation), and the systems has formed an interesting test-bed to formalize cognitive theories and to experiment with their operationalization (Andriessen & Sandberg, 1999). AI in education has been applied to various domains, such as physics, programming, writing essays, and reading as well as the development of instructional systems. The most typical AI applications in the educational field involve knowledge representation, intelligent tutoring, natural language processing, and autonomous agents (Drigas & Ioannidou, 2012). AI in education has created powerful learning environments and positive interactive experiences for students over the decades.

Additionally, AI application tools have successfully been applied to solve problems in special education related to physical and sensory impairments, Autistic Spectrum Disorders, reading/writing/spelling difficulties, dyslexia, Attention Deficit Hyperactivity Disorder, difficulties in mathematics, and Attention Deficit Disorder (Drigas & Ioannidou, 2012). The focus of Artificial Intelligence in education is on the development and evaluation of computer software to improve teaching and learning. Woolf (2015) believed that AI is invaluable because it can personalize instruction, enhance student experience, supply data for the development of novel education theory, and teach 21st century skills (i.e., cognitive skills, interpersonal skills, intrapersonal skills). Luckin, Holmes, Griffiths, and Forcier (2016, p.14) pinpointed that "AI scientists are currently building on new approaches in machine learning, computer modeling, and probability statistics to improve financial decision making, and are using decision theory and neuroscience to drive the development of more effective medical diagnostics."

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