Chapter 7
Evaluation of AI-Based Accessibility Technologies for Disabled Higher Education Students Using Fuzzy Cocoso Method

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ABSTRACT

This study examines the role of artificial intelligence (AI) technologies in the education of students with disabilities and provides a comprehensive assessment of how these technologies can transform educational processes. Also, the study explores the impact of AI-based technologies such as speech recognition, text-to-speech, and automated captioning systems in increasing accessibility for students with disabilities. In evaluating AI-based technologies tailored to the educational needs of students with disabilities, multi-criteria decision-making methods such as fuzzy logic and the Fuzzy CoCoSo method were utilized. The analysis results demonstrate that these technologies contribute substantially to enhancing students' learning motivation, supporting academic success, and developing independent mobility skills. This study addresses the contributions of AI to educational accessibility from a perspective of social justice and equity and offers recommendations for the effective use of AI-supported accessibility technologies in this field.

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INTRODUCTION

The rapid development of both hardware and software technologies has transformed instructional methods, enabling educators to create more engaging and technology-enhanced learning experiences. As these advancements continue, technology's role in enhancing academic skills becomes even more crucial. The flexibility offered by digital tools allows students to engage with learning content anywhere and anytime, reinforcing the need to integrate technology within educational settings (Geist, 2011).

Inclusive education has also become a central issue in global education systems, particularly regarding students with disabilities. Since the early 18th century, educational policymakers have increasingly recognized the value of creating inclusive school environments that accommodate diverse student needs. This "full inclusion" approach, as adopted by various countries, seeks to ensure equal access to education regardless of student differences (Onaga & Martoccio, 2008).

With the emergence of artificial intelligence (AI) in the mid-20th century, AI applications have expanded significantly within our fast-evolving digital landscape. Heightened expectations—driven by media, industry experts, and scientific advancements—have fueled AI's applications across various fields, including education, healthcare, and finance (Chan & Zary, 2019). Although there is no universally agreed definition of AI, it is broadly understood as an interdisciplinary field combining elements from computer science, psychology, linguistics, neuroscience, and philosophy, among other disciplines (Chen et al., 2020).

AI is fundamentally structured around three main paradigms: symbolic (logic- and knowledge-based), statistical (probabilistic and machine learning models), and subsymbolic (embodied intelligence and heuristic search). These paradigms allow AI to address diverse challenges across domains such as perception, reasoning, knowledge management, and communication. Today, AI is used in fields ranging from automotive and finance to medicine and education (Russell & Norvig, 2016).

The influence of AI-powered technologies is now embedded in everyday life, reshaping how people think, act, and communicate. As AI has advanced—especially with the rise of Artificial Neural Networks (ANN) and Deep Learning (DL)—its applications have grown substantially, offering new potential across many sectors (Chan & Zary, 2019).

Specifically, the use of AI in education, known as Artificial Intelligence in Education (AIEd), focuses on developing technologies that can perform cognitive tasks similar to human learning and problem-solving processes (Baker et al., 2019). Through advanced techniques like Natural Language Processing (NLP) and interactive chatbots, AI enhances educational environments, making learning more personalized and engaging (Alhawiti, 2014; Karsenti, 2019). In addition, AI-based tools in education have led to innovations like educational data mining and learning

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