Chapter 6
Innovating Education 6.0 With LLM Classroom Strategies for Robotics and Computing Skills Integration in EFL Ecosystem

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ABSTRACT

The purpose of this study is to improve classroom tactics in teaching computing and robotics in an EFL environment. It seeks to investigate the integration of Large Language Models (LLM) within the Education 6.0 framework. This study contributes to the growing body of literature on the role of AI in the classroom by demonstrating that LLM can serve as a bridge between technical and language instruction. Future research should investigate the long-term effects of LLM integration on student performance and extend this strategy to other STEM-related domains within the EFL ecosystem.

INTRODUCTION

A new paradigm, known as "Education 6.0," is taking shape in response to society's changing demands brought about by the exponential growth of technological capabilities. Digital tools, automation, and artificial intelligence are reshaping traditional teaching approaches in Education 6.0, the new paradigm in education (Peláez, 2024). A branch of AI known as Large Language Models (LLMs) presents a unique opportunity to improve learning outcomes, particularly in computer science and robotics. By leveraging LLMs, educators can better prepare their students for the challenges of the Fourth Industrial Revolution (4IR) and implement new teaching practices that address the complexities of contemporary education. The ability to successfully incorporate LLMs and related technologies into classroom instruction is critical as Indonesia embarks on its journey towards digital transformation (Filippi and Motyl, 2024). Despite growing awareness of the potential of LLMs in education, there is a significant lack of studies on their use in robotics and computing classroom practices. So far, most research on AI in education has concentrated on three main areas: adaptive learning systems, personalized learning, and automated assessment.

However, researchers have not thoroughly studied the relationship between LLMs and practical, hands-on areas like robotics in teaching. There is a lack of in-depth studies that address the specific challenges and opportunities faced by developing countries like Indonesia because most studies focus on wealthy countries with more advanced education systems and technical infrastructure. Furthermore, there is a lack of focus on pedagogical frameworks that enable the integration of robotics and computing into the classroom, even though these subjects are essential for STEM education. Especially in public schools in Indonesia, the use of computers and robots in the classroom is still in its infancy. There have been efforts to promote STEM education and digital literacy, such as the "*Merdeka Belajar*" program, but major obstacles remain. Some of these issues include curricula that do not always keep up