Chapter 6
Artificial Intelligence–Supported Formative and Summative Assessment Approaches in Blended Learning Environments

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ABSTRACT

This chapter explores the role of artificial intelligence (AI) and summative assessment in blended learning environments, beginning with the historical evolution of assessment systems. It highlights the limitations of traditional methods in objectivity, validity, inclusiveness, and feedback. AI technologies address these issues through functions such as personalised learning, real-time feedback, automated scoring, and enhanced test security. AI not only reduces teachers' workload but also enriches students' learning through data-driven insights. While formative assessment guides learning based on immediate performance data, summative assessment evaluates outcomes effectively. These AI-supported approaches transform assessment into a continuous, integrated component of the learning process. The chapter also addresses ethical concerns, such as data privacy and algorithmic fairness, stressing

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the importance of teacher competence and secure data handling. In conclusion, AI-enhanced assessment extends beyond traditional boundaries and becomes a dynamic tool to support learning.

INTRODUCTION

Blended learning (BL) refers to the deliberate combination of face-to-face and online teaching (Abu Bakar, 2021). In this model, traditional classroom activities are supported by digital learning resources to create flexible and multi-modelled learning experiences. BL aims to provide effective learning experiences by blending various approaches such as coaching, online courses, peer interactions, workshops and participation in online communities (Rossett et al., 2003). This design creates rich communication and interaction opportunities between students and teachers by integrating digital technologies and face-to-face interaction (Røe et al., 2022). In successful examples of blended learning, features such as flexibility, personalisation and active learning stand out; blended learning is considered not only as a technological integration but also as a pedagogical approach that encourages student engagement and individualised learning pathways (Margulieux et al., 2016).

This approach allows students to participate more flexibly in the learning process and provides instructors with the opportunity to enrich their teaching materials with various digital tools. Research shows that blended learning applications can increase student achievement levels and support individualised learning opportunities (Bernard et al., 2014; Graham, 2013).

However, there are also various difficulties in the implementation of blended learning. Especially for students with low levels of digital literacy, access and interaction with online components may be limited. In addition, the lack of pedagogical and technological competences of instructors may prevent the effective implementation of blended learning (Halverson et al., 2014). There are also challenges such as technological problems, the need for self-discipline, and possible feelings of isolation among students (Bandara & Jayaweera, 2024). All these situations can reduce educational effectiveness and deepen inequalities in the learning process.

In recent years, the use of blended learning has rapidly spread on a global scale due to the impact of the COVID-19 pandemic. After the pandemic, higher education institutions have turned more towards blended learning as a sustainable and accessible learning model, and many universities have made this model permanent (Hodges et al., 2020). In addition, the development of digital technologies and the widespread use of learning management systems have facilitated the diversification of blended learning applications and their integration into the education system.

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