Understanding Student Engagement in AI-Powered Online Learning Platforms:
A Narrative Review of Key Theories and Models

Manuel B. Garcia
https://orcid.org/0000-0003-2615-422X
FEU Institute of Technology, Philippines

Joanna Rosak-Szyrocka
https://orcid.org/0000-0002-5548-6787
Czestochowa University of Technology, Poland

Chai Lee Goi
https://orcid.org/0000-0003-0131-2818
Curtin University, Sarawak, Malaysia

Ari Happonen
https://orcid.org/0000-0003-0744-1776
LUT University, Finland

Kate Shively
https://orcid.org/0000-0002-9916-0535
Ball State University, USA

Aras Bozkurt
https://orcid.org/0000-0002-4520-642X
Anadolu University, Turkey

Damian Maher
https://orcid.org/0000-0002-3566-0805
University of Technology Sydney, Australia

Robertas Damaševičius
https://orcid.org/0000-0001-9990-1084
Vytautas Magnus University, Lithuania

EXECUTIVE SUMMARY

Online learning has become fundamental to modern academic and professional development. Amidst its widespread adoption, there is increasing integration of artificial intelligence (AI) to enhance the learning experience. Understanding student engagement within these AI-powered digital platforms is crucial, as it directly

influences learning outcomes and satisfaction. This chapter provides a narrative review of key theories and models essential for analyzing engagement in virtual learning contexts. Particularly, it focuses on constructivist learning theory, social learning theory, cognitive load theory, flow theory, technology acceptance model, self-determination theory, cognitive theory of multimedia learning, and feedback intervention theory. By examining these frameworks through an epistemological lens, the chapter explores how knowledge acquisition, cognitive processing, and social learning principles interact within AI-enhanced educational contexts. The insights reported here can serve as a guide for optimizing AI to maximize student involvement and educational efficacy.

INTRODUCTION

The educational landscape has been undergoing extensive transformations. Due to recent and constant disruptions to physical classes, online learning is emerging as a dominant mode of instructional delivery. The COVID-19 pandemic, in particular, accelerated the shift toward digital education (Bozkurt et al., 2022; Ofosu-Ampong et al., 2024). This change compelled institutions worldwide to adapt quickly to emergency remote teaching and learning methods. This transition highlighted the flexibility and accessibility of online learning, making it an attractive option for students and educators alike (Betthäuser et al., 2023). With technological advancements and increasing internet accessibility, online learning has evolved from a supplementary tool to a primary mode of education delivery. It has democratized education by providing opportunities for learners from diverse geographical locations and backgrounds, allowing them to access high-quality educational resources and instruction without the constraints of time and place. Consequently, online learning has not only become more prevalent but also more sophisticated, incorporating a range of interactive and personalized learning experiences (Iyer et al., 2022).

In online learning, student engagement is one of the critical factors for determining the effectiveness of the educational experience (Aliyu et al., 2022). Student engagement refers to the level of interest, curiosity, and participation that students exhibit in the learning process. It encompasses emotional, behavioral, and cognitive dimensions, influencing how students interact with the course content, their peers, and instructors (Reschly & Christenson, 2012). Engaged students are more likely to retain information, perform better academically, and develop essential skills such as critical thinking and problem-solving (Bond et al., 2020; Li & Xue, 2023). Fostering engagement in online learning contexts is particularly important due to the lack of physical presence, face-to-face interaction, and the natural social cues inherent in traditional classroom settings. Without these elements, students