

AI-DRIVEN FRAMEWORK FOR TRUSTWORTHY EDUCATIONAL SYSTEMS, INFORMATION INTEGRITY, AND PREDICTIVE DECISION-MAKING USING LARGE LANGUAGE MODELS AND DATA ANALYTICS

Rohan Patel, Aditi Singh & Manish Chandr

Department of Computer Science and Engineering, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India

ABSTRACT

Artificial Intelligence (AI), particularly Large Language Models (LLMs), has rapidly transformed educational systems by enabling intelligent tutoring, personalized learning, automated assessment, and data-driven decision-making. Despite these advancements, concerns regarding information integrity, algorithmic bias, misinformation, lack of transparency, and ethical accountability continue to challenge the effective deployment of AI in education. This study proposes an AI-driven framework for developing trustworthy educational systems by integrating Large Language Models with information integrity mechanisms and predictive data analytics. The proposed framework emphasizes responsible AI governance, explainable decision-making, automated misinformation detection, and intelligent predictive models that support evidence-based educational planning. By leveraging predictive data analytics, the framework enables institutions to identify at-risk learners, forecast academic performance, optimize learning pathways, and improve institutional decision-making while maintaining the reliability and credibility of educational information. The framework also incorporates human oversight, ethical AI principles, and continuous validation processes to ensure that AI-generated content remains accurate, transparent, and aligned with educational objectives. A quantitative research approach is adopted to evaluate the proposed framework using responses collected from stakeholders within higher education institutions. The anticipated findings indicate that integrating Large Language Models with trustworthy AI principles and predictive analytics enhances educational effectiveness, strengthens information integrity, improves user confidence, and supports informed academic decision-making. The study contributes to the growing field of educational artificial intelligence by presenting a comprehensive framework that addresses technological, ethical, and informational challenges associated with AI-powered learning systems. Furthermore, the study provides practical recommendations for educational institutions, policymakers, researchers, and AI developers seeking to implement secure, transparent, and learner-centered intelligent educational systems.

KEYWORDS: *Artificial Intelligence, Large Language Models, Information Integrity, Predictive Data Analytics, Trustworthy Educational Systems.*

Article History

Received: 07 Dec 2025 | Revised: 10 Dec 2025 | Accepted: 14 Dec 2025
