The Impact of Personalized Educational Recommender Systems on Learning Efficiency in Higher Education

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DECLARATION

I declare that this is my own work, and this thesis/dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

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The above candidate has carried out research for the ~~PhD/MPhil~~/Masters thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of Supervisor: Dr. Buddhika Karunarathne

Signature of the Supervisor: Date: 30/06/2025

DEDICATION

This work is dedicated to my parents, whose unwavering support, guidance, and encouragement have been instrumental in my academic and personal growth. Their values and perseverance have been a constant source of inspiration, shaping the foundation of my achievements.

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ABSTRACT

In today's academic landscape, university students face challenges in identifying relevant and high-quality educational resources due to the overwhelming availability of digital content. The process of locating specific materials or answers to academic queries often requires navigating vast and irrelevant information, leading to inefficiencies in learning. This research addresses these challenges by developing a personalized educational recommender system that integrates machine learning techniques with the advanced capabilities of Large Language Models (LLMs).

Unlike traditional recommender systems that focus solely on suggesting materials, the proposed solution is designed to deliver personalized recommendations and provide precise answers to students' specific inquiries. This approach aims to align recommended resources with students' academic modules and research objectives, fostering a more tailored and effective learning experience.

The primary objectives of this study include designing the recommender system to support personalized learning and evaluating its impact on students' learning outcomes, engagement, and motivation. By simplifying access to relevant materials and addressing individual learning needs, this system seeks to enhance the efficiency and quality of the academic experience. Ultimately, the research contributes to advancing learning technologies, making it easier for students to achieve their academic goals while addressing the growing challenges of information overload.

Keywords: Personalized educational recommender system, Large Language Models, Educational Domains, Precise query-based answers

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