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Chatbot Personalities in Digital Learning: Integrating Characteristics that Support Learning to Enhance Learner Engagement

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Abstract

The integration of AI chatbots in digital learning has reshaped how students engage with content, instructors, and peers. However, limited research has explored how personality-driven chatbot designs can improve learning effectiveness and engagement. This study proposes an AI chatbot model incorporating five personality traits - empathy, humour, authoritative, peer-like collaboration, and adaptive flexibility - to create a more humanised and supportive learning experience. The chatbot will be developed using Natural Language Processing integrated with a Large Language Model to detect emotions, identify intent, and generate adaptive responses. A quasi-experimental study will be conducted with undergraduate students, comparing an experimental group (enhanced personality chatbot) and a control group (baseline chatbot without these traits).

Learner engagement, motivation, and learning experience will be measured using validated instruments such as the Student Engagement Questionnaire, Instructional Materials Motivation Survey (IMMS), and an adapted USE Questionnaire. It is expected that the proposed model will improve student motivation, engagement, and satisfaction while offering insights into how emotionally intelligent AI can enhance personalised education. This research will contribute to human-centred educational AI and highlight the value of personality-driven chatbot design in creating trustworthy, empathetic, and effective learning technologies. © 2025 IEEE.

Author keywords

Artificial Intelligence; Educational chatbots; Large Language Model; learner engagement; learner motivation; learning experience

Indexed keywords

Engineering controlled terms

Chatbots; Distributed computer systems; E-learning; Engineering education; Learning systems; Motivation; Natural language processing systems; Students

Engineering uncontrolled terms

Chatbots; Digital-learning; Educational chatbot; Language model; Large language model; Learner engagement; Learner's motivations; Learning experiences; Student engagement; Support learning

Engineering main heading

Artificial intelligence

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