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AI-Enhanced Self-Regulated Learning: Proposing a Comprehensive Model with 'Studium' to Meet a Student-Centric Perspective

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Abstract : Objective: The Faculty of Chemistry Education at Humboldt University has developed ‘Studium’, a web application designed to enhance long-term self-regulated learning (SRL) and academic achievement. Leveraging advanced generative AI, ‘Studium’ offers a dynamic and adaptive educational experience tailored to individual learning preferences and languages. The application includes evolving tools for personalized notetaking from preferred sources, customizable presentation capabilities, and AI-assisted guidance from academic documents or textbooks. It also features workflow automation and seamless integration with collaborative platforms like Miro, powered by AI. This study aims to propose a model that combines generative AI with traditional features and customization options, empowering students to create personalized learning environments that effectively address the challenges of SRL. Method: To achieve this, the study included graduate and undergraduate students from diverse subject streams, with 15 participants each from Germany and India, ensuring a diverse educational background. An exploratory design was employed using a speed dating method with enactment, where different scenario sessions were created to allow participants to experience various features of ‘Studium’. The session lasted for 50 minutes, providing an in-depth exploration of the platform's capabilities. Participants interacted with Studium’s features via Zoom conferencing and were then engaged in semi-structured interviews lasting 10-15 minutes to gain deeper insights into the effectiveness of ‘Studium’. Additionally, online questionnaire surveys were conducted before and after the session to gather feedback and evaluate satisfaction with self-regulated learning (SRL) after using ‘Studium’. The response rate of this survey was 100%. Results: The findings of this study indicate that students widely acknowledged the positive impact of ‘Studium’ on their learning experience, particularly its adaptability and intuitive design. They expressed a desire for more tools like ‘Studium’ to support self-regulated learning in the future. The application significantly fostered students' independence in organizing information and planning study workflows, which in turn enhanced their confidence in mastering complex concepts. Additionally, ‘Studium’ promoted strategic decision-making and helped students overcome various learning challenges, reinforcing their self-regulation, organization, and motivation skills. Conclusion: This proposed model emphasizes the need for effective integration of personalized AI tools into active learning and SRL environments. By addressing key research questions, our framework aims to demonstrate how AI-assisted platforms like “Studium” can facilitate deeper understanding, maintain student motivation, and support the achievement of academic goals. Thus, our ideal model for AI-assisted educational platforms provides a strategic approach to enhance student's learning experiences and promote their development as self-regulated learners. This proposed model emphasizes the need for effective integration of personalized AI tools into active learning and SRL environments. By addressing key research questions, our framework aims to demonstrate how AI-assisted platforms like ‘Studium’ can facilitate deeper understanding, maintain student motivation, and support the achievement of academic goals. Thus, our ideal model for AI-assisted educational platforms provides a strategic approach to enhance student's learning experiences and promote their development as self-regulated learners.

Keywords : self-regulated learning (SRL), generative AI, AI-assisted educational platforms
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