

Application of AI-Powered Chatbots in Teaching Applied Sciences

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INTRODUCTION & AIM

Applied sciences and engineering education increasingly rely on advanced digital tools that foster practical skills and analytical thinking. Artificial intelligence (AI) solutions are gaining importance as they support the development of data-driven decision-making and problem-solving competencies.

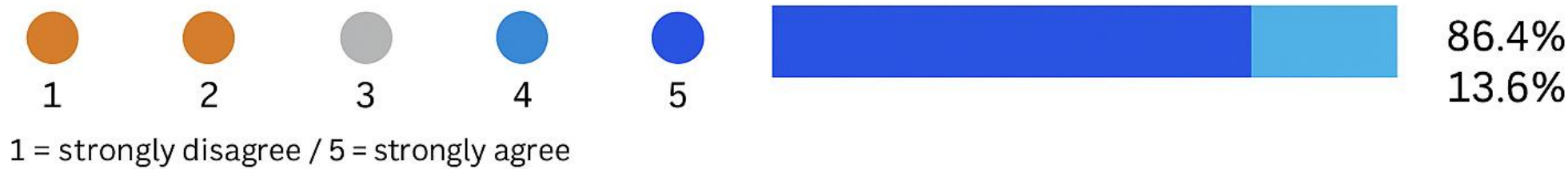
The aim of this study was to develop and evaluate an AI-based educational chatbot to enhance student learning in data analysis and statistical process control, ensuring content quality and safe use through exclusive reliance on instructor-provided materials.

METHOD

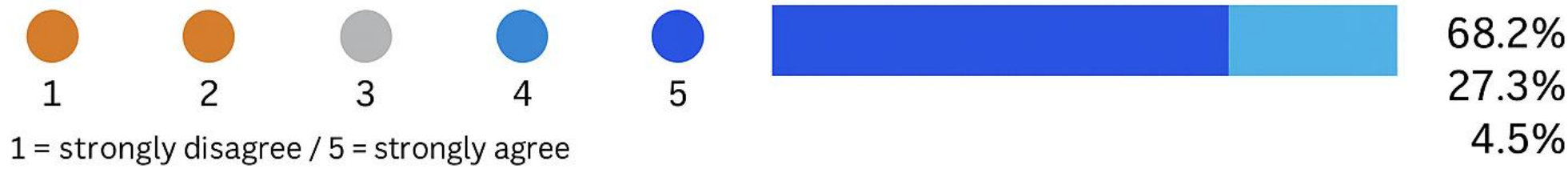
The chatbot was implemented on the ChatGPT-4o (Custom GPT) platform and generates tasks, data files, step-by-step instructions in Statistica, quizzes, and control questions, enabling self-paced and interactive learning. It was integrated into the Standardization of Production Processes course and evaluated using a student survey and a Computer-Assisted Video Interview (CAVI).

RESULTS & DISCUSSION

Was the chatbot easy to use?



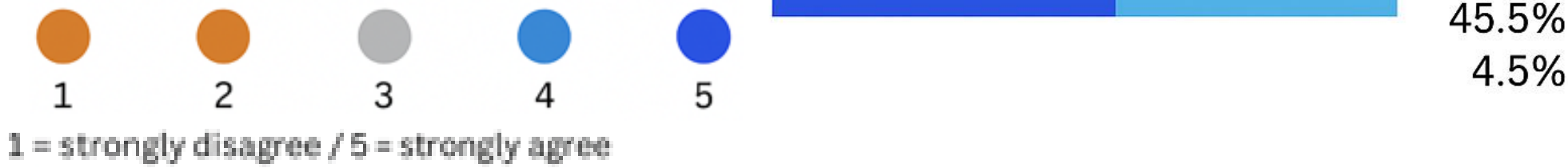
Were the chatbot's responses clear and easy to understand?



Were the step-by-step instructions for Statistica helpful?



Did the chatbot personalize the level of knowledge delivered according to your preferences?



Did the quizzes/tasks generated by the chatbot make learning easier for you?



How do you assess the impact of using the chatbot on your performance in preparing for and studying tasks and exams in PPS?



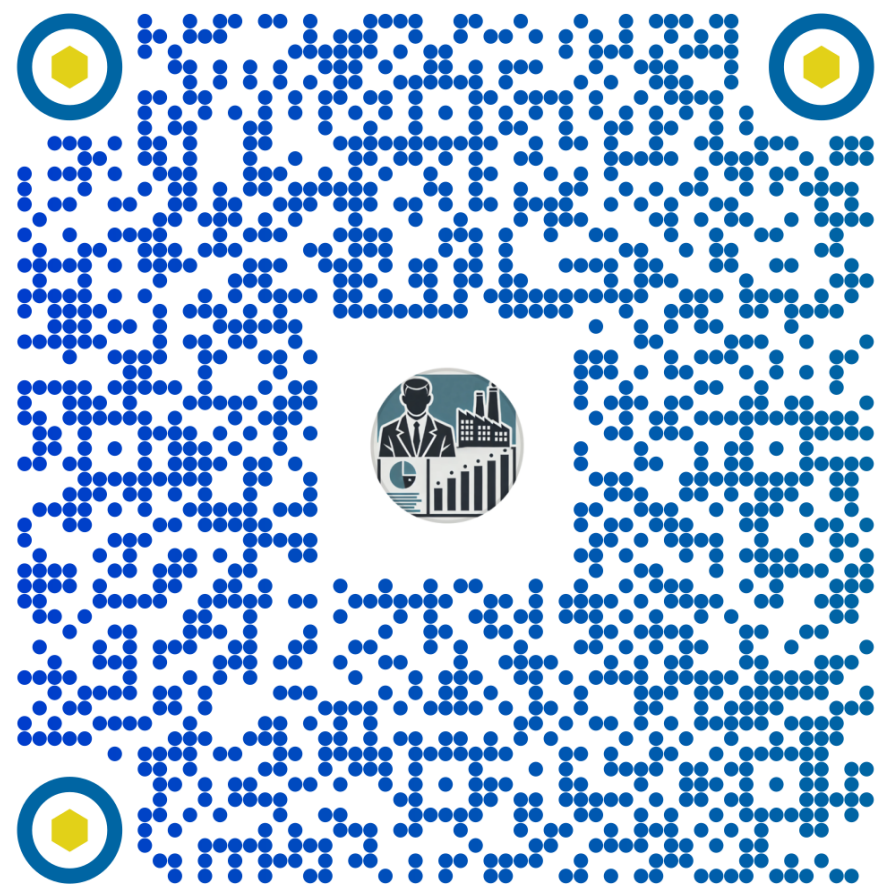
Did the chatbot motivate you to regularly review material?



Have your prompt (command) formulation skills improved through working with the chatbot?



Evaluation results demonstrated high acceptance: 86.4% of students found the chatbot easy to use, 95.5% rated its responses as clear and understandable, 100% found Statistica's instructions helpful, and 95.5% reported that the content was tailored to their individual preferences. Quizzes and tasks supported learning for 90.9% of students and improved preparation for assignments and tests, while 77.2% reported increased motivation for regular revision, and 77.3% noted improvement in prompt formulation skills.



CONCLUSION

The AI chatbot thus provides a controlled environment for personalized learning and practical training in statistical process control, linking theoretical concepts with hands-on applications. Its design can be adapted to other technical and engineering courses, offering a scalable model for integrating AI-driven tools into higher education curricula focused on applied competencies.