The Hong Kong Polytechnic University 香港理工大學
EDC Educational Development Centre 教學發展中心

GenAI in Learning, Teaching and Assessment

03

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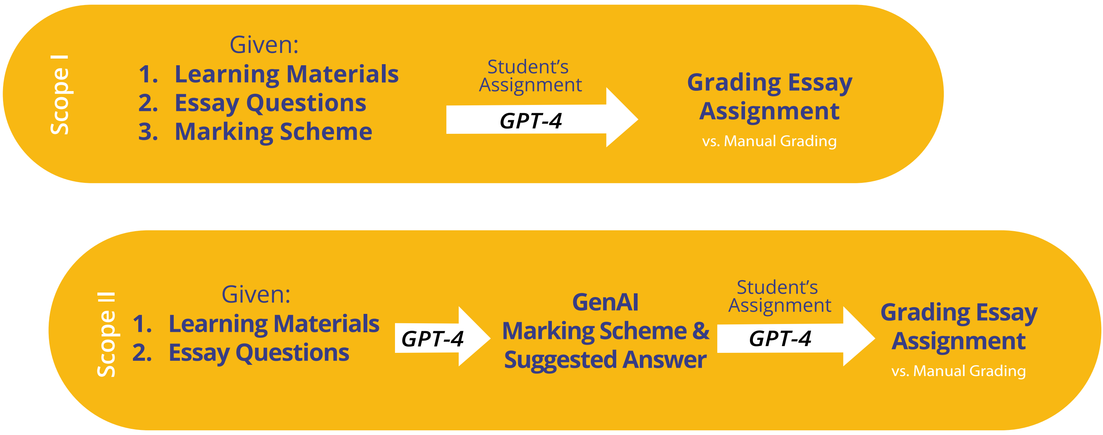
ISE328
Introduction to RFID Technology

Why did the instructor use GenAI for learning and teaching?

Carman and YM kept abreast of the evolution of artificial intelligence from task-specific GenAI to general GenAI. They were particularly interested in the potential applications of GenAI as an Intelligent Virtual Tutor and its ability to provide specific domain knowledge. In this case study, Carman and YM aimed to investigate the extent to which GenAI could assess students' performance, understand their challenges, and provide feedback. They sought to explore the similarities and differences between GenAI-assisted grading and manual grading, as well as their respective impacts on student learning.

How was GenAI used in this scenario?

Carman and YM used a two-stage approach to study the similarities and differences between GenAI-assisted grading and manual grading. They used GPT-4 for the GenAI-assisted grading. In Stage 1, they provided learning materials, essay questions, and a marking scheme to the GPT-4 engine and asked GPT-4 to grade students' assignments. In Stage 2, the main difference was that instead of giving the marking scheme directly to the GPT-4 engine, Carman and YM asked GPT-4 to fine-tune the marking scheme by, for example, providing a detailed breakdown of each criterion, suggested answers, marking rubric, and answer analysis. Both stages of manual grading were also done for grading students' assignments. The picture below illustrates the two-stage approach:



What was the impact on student learning?

The findings were inspirational and shed light on how teachers can use GenAI to help GenAI learn to assist teachers as well as students in optimising learning and teaching tasks. For Stage 1, Carman and YM found that GenAI grading generally fell within a +/- 5-point range of manual grading, with two cases in which manual grading did not strictly adhere to the marking scheme. For Stage 2, GPT-4 was trained to fine-tune the marking scheme by providing more concrete details of the marking scheme, which was the part of manual grading that was seldom addressed. The grading results showed that the refined version of GenAI grading was consistent with manual grading, and on the basis of the refined marking scheme, the student answer analysis and personalised feedback provided by GenAI successfully identified areas for improvement from students, actualising GenAI-assisted personalised learning.

What were the challenges encountered during the implementation and what solutions were used?

Carman and YM discovered that GPT-4 was unable to recognise figures and tabular information during implementation. Although they did not observe significant grading differences between Stage 1 GenAI-assisted grading and Stage 2 GenAI-assisted grading, they found that Stage 2 was a much better approach for supporting personalised learning with GenAI.

In the future, prompts and parameters will need to be fine-tuned for ChatGPT to recognise figures and tabular information. Carman and YM look forward to the capabilities of GPT-4o, which includes multimodal recognition, to address this challenge.