



Case Study 4: Kingston University

Using Artificial Intelligence to Support Undergraduate Game Programming: Developing a Game Design Advisor

What issue were we trying to address and why?

To investigate how generative AI (artificial intelligence) can be used to support undergraduate game programming students in the process of designing and developing their own games.

What we did

This is being explored through the development of a custom plugin for Unity, which is one of the two principal commercial game engines taught on the Games courses. The plugin appears as an additional window within the Unity editor, presenting itself as a game design advisor. This tool is designed to support students in tasks such as brainstorming game concepts, refining mechanics, generating narrative ideas, and suggesting code snippets or debugging strategies.

Who was involved

Dr Darrel Greenhill, Associate Professor, School of Computer Science and Mathematics, Kingston University.

Measures of success

This plugin is currently being piloted with Level 5 (second year) students and success will be measured in terms of student engagement and feedback on using the tool, and the quality of the responses.

How do you plan to develop the intervention/activity?

An extended version of the plugin is under development using the OpenAI Application Programming Interface (API). The plugin converts PowerPoint slides from teaching sessions into text along with generating visual descriptions. This information is then used by the plugin to inform the answers it provides to students.

When a student asks the plugin a question, it first checks the lecture materials for an answer. If no relevant lecture slide is found the Large Language Model (LLM) uses its wider knowledge of Unity and game development to find an answer if this is requested. The plugin also features a "Capture Game View" button which captures an image of the game under

development and sends it to the AI along with the question. This helps the AI to provide more tailored advice on the design, visuals and coding of the game.

The plugin is being piloted within the Level 5 (second year) Professional Game Development Environments module where students design and implement a game in Unity. As part of this module students are developing skills in AI for games, so will be able to not just use the plugin for their own projects but would also have the ability to extend the functionality of the tool themselves.

The technical details: Custom Python code is used to convert the PowerPoint slides, combined with a vision API to generate visual descriptions. The output is converted into a structured JSON file and using a technique called retrieval-augmented generation (RAG) the Unity plugin can search and retrieve relevant content to inform its answers.