Project Details – Team 4

Project Team

Project Title: Harnessing the power of GPT to transform online courses, foster scientific literacy, and deter cheating.

	Team Lead	Team Member	Team Member
Name	Richard Jerousek	Tong Wan	Zhongzhou Chen
College	Science	Science	Science
Department	Physics	Physics	Physics
Department Chair	Joshua Colwell	Joshua Colwell	Joshua Colwell

Additional team members who are non-teaching faculty or CDL staff members:

- Nelson Roque
- Roslyn Miller

Project Details

Course Prefix	Course Title	Modality (see reference above)	Instructor of Record	Semester & Year to be Taught
AST 2002	Intro. to Astronomy	W	Richard Jerousek	Fall 2023/Spring 2024
PHY 1038	Physics of Energy, Climate Change, and the Environment	W	Tong Wan	Fall 2023/Spring 2024

Technology implemented:

- AI-enabled content created and distribution (such as, Chat GPT, AI generated art, or AI avatars)

PHY 1038:

(1) Created 5 problem banks for midterm exams using Chat GPT.

(2) Added two instances of AI-generated climate-misinformation training/assessment. The first instance was implemented in Fall 2023 as a single assessment of writing a response to an AI simulated climate misinformation, choosing the most relevant piece of information from the course.

The second instance was implemented in Spring 2024 as a learning module, which included three

components:

1. Instructional materials on logical fallacies generated by GenAI.
2. "Inoculation" training of logical fallacies: ask students to identify two types of logical fallacies: Cherry Picking and Red Herring. Those training activities are in non-climate related contexts, such as car salesperson or health-product advertisements. The problem contexts are also simulated by generative AI.
3. Climate misinformation with targeted logical fallacies: Using AI to simulate climate misinformation that contains the above mentioned two types of logical fallacies, and asked students to write comment on the misinformation. We will examine if students mentioned those logical fallacies in their comments.

- Changed paper and pencil homework into online homework

In PHY 1038, 5 of the paper and pencil homework assignments were changed into Canvas quizzes. The questions formats in the quizzes included multiple choice, multiple answer, numerical answer and formula question. General feedback was added to each question to support student learning.

AST 2002:

1. Created problem banks with over 650 questions, tagged by learning objective into 139 question banks. Partially using GPT implemented in Fall 2023 and Spring 2024.
2. Implemented 2 learning modules to foster science literacy in Fall 2023 and Spring 2024: Understanding graphs and Basic Quantitative skills and Essentials of Statistics.
3. 5 additional learning modules are nearing completion:
   1. Identifying Valid Scientific Arguments
   2. Evaluating the Validity of Sources
   3. Understanding Elements of Research Design and How They Impact Scientific Conclusions
   4. Evaluating the Use and Misuse of Scientific Information
   5. Justifying Inferences with Quantitative Data

These 5 modules were constructed using Open AI's ChatGPT based on learning objectives from an assessment of science literacy skills (TOSLS)[1]. ChatGPT was also used to aid our construction of assessment questions designed to help students identify mis/disinformation.

First, we created several personalities i.e. a smalltown Florida mayor and climate science denier, a social media influencer and flat-earther, etc. Next, Chat GPT produced one paragraph statements from each of these personalities to their intended audience(s) containing some scientific mis/disinformation. Finally, our teaching assistant, Judith Lojo designed assessments which test the student's ability to harness the science literacy skills covered in that module to identify the mis/disinformation in the paragraph.