

GAI-Enhanced Assignment Framework: A Case Study on Generative AI Powered History Education

Introduction

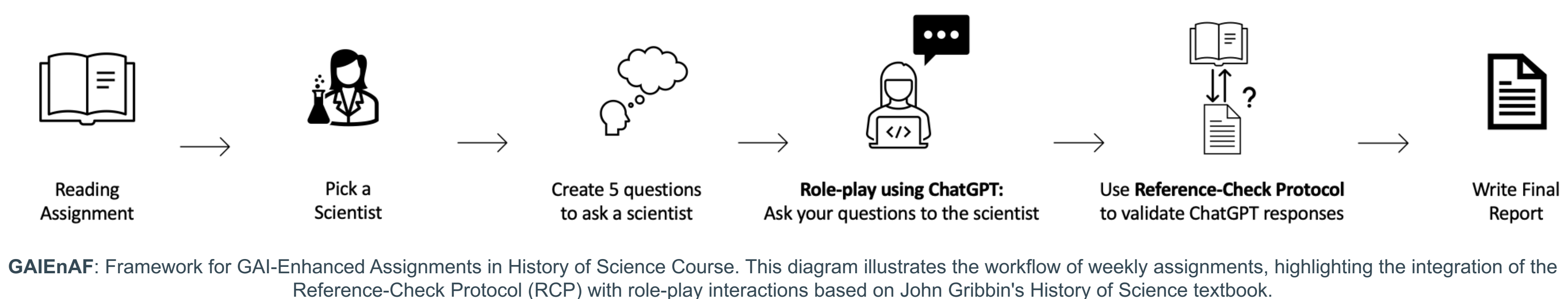
As we navigate the frontier of technological advancements in the education domain, Large Language Models (LLMs) have emerged as a promising tool for pedagogical innovation. ChatGPT stands out due to its advanced natural language processing and generation capabilities. Our research at Hacettepe University critically examines the integration of ChatGPT within the "History of Science" undergraduate curriculum.

We introduce the '**GAI-Enhanced Assignment Framework (GAIEnAF)**', a novel pedagogical strategy that incorporates role-playing methodologies to facilitate immersive interactions between students and AI-simulated historical figures. This framework not only fosters a more engaging learning environment but also enriches the comprehension of historical narratives.

Concurrently, we implement the '**Reference-Check Protocol (RCP)**', a rigorous method designed to uphold academic integrity and verify the factual accuracy of the AI-generated content, ensuring the maintenance of high educational standards.

GAI-Enhanced Assignment Framework (GAIEnAF)

Our primary goal with using Generative AI in educational courses is to elevate student engagement, enhance learning efficacy, and cultivate critical thinking. The 'GAI-Enhanced Assignment Framework' is designed for the safe and effective integration of these technologies, ensuring academic thoroughness and integrity.



Reference-Check Protocol (RCP)

Integrating Generative AI tools like ChatGPT into educational settings is innovative but raises concerns about content authenticity. To address this, we've developed the Reference-Check Protocol (RCP), ensuring AI-generated content adheres to academic standards by aligning with validated reference materials.

In practice, students engage ChatGPT in role-play, then cross-reference its responses with primary sources, like John Gribbin's 'History of Science' textbook, as part of their weekly assignments. This process includes:

- 1. Annotation:** Students annotate AI responses with source citations, noting alignments or deviations from the textbook.
- 2. Critical Analysis:** They critically evaluate the context and relevance of the AI's responses.
- 3. Peer Review:** Uploaded to kaynakca.info, these analyses are reviewed by peers, fostering collaborative learning and content verification.

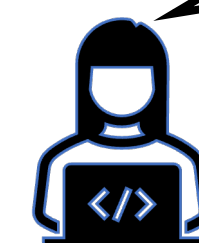
Key Outcomes and Benefits of the RCP

The Reference-Check Protocol (RCP) plays a pivotal role in enhancing the educational use of Generative AI:

- ❖ **Integrity and Accuracy:** Ensures AI-generated content is aligned with recognized academic sources, maintaining the integrity and accuracy of educational material.
- ❖ **Critical Thinking:** Encourages students to validate and critique AI responses, fostering critical analysis and deeper engagement with the content.
- ❖ **Collaborative Learning:** Promotes peer review processes, enabling students to gain from diverse perspectives and enhance their understanding.
- ❖ **Adaptability:** As AI tools and reference materials evolve, the RCP adapts to ensure the responsible and effective use of GAI in education, with a consistent emphasis on academic integrity.

Role-playing Sample: *ChatGPT acts as Gregor Mendel*

How did your experiments differ from previous methods used in plant breeding studies?



Ah, an excellent question. My experiments differed significantly from previous methods used in plant breeding studies. You see, I approached my investigations with a more systematic and rigorous approach, employing careful observations, meticulous record-keeping, and the application of statistical analysis. Unlike many of my predecessors who relied on simply crossing plants without much consideration for the underlying patterns, I meticulously studied the inheritance of traits in pea plants over multiple generations.

One key aspect of my methodology was the selection of distinct traits that exhibited clear variations, such as flower color, seed shape, and plant height. By selecting these discrete traits, I was able to easily track their transmission from one generation to the next. I carried out controlled cross-pollination between pea plants, carefully tracking the inheritance of these traits and noting the ratios of their occurrence in subsequent generations. Furthermore, I took great care to ensure the purity of my experimental lines by eliminating any potential contamination from external pollen sources. This allowed me to establish true-breeding lines that consistently exhibited specific traits. By meticulously observing and analyzing the resulting offspring, I was able to uncover the principles of inheritance and propose the now-famous laws of Mendelian genetics.

In summary, my experiments differed from previous methods in their systematic approach, precise selection of traits, controlled cross-pollination, and extensive record-keeping. These methodologies formed the foundation of modern genetics and revolutionized our understanding of heredity.



References

- Tufan Adiguzel et al. (2023). "Revolutionizing education with ai: Exploring the transformative potential of chatgpt." Contemporary Educational Technology, 15:ep429, 04.
- Marta Montenegro Rueda et al. (2023). "Impact of the implementation of chatgpt in education: A systematic review." Comput., 12:153.
- Mengqian Wang et al. (2023). "The potential impact of chatgpt on education: Using history as a rearview mirror." ECNU Review of Education, page 20965311231189826.
- S. Grassini. (2023). "Shaping the future of education: Exploring the potential and consequences of AI and chatgpt in educational settings." Education Sciences, 13:692.

