

AI Classroom Challenge Submission

Use Case Title:

Leveraging Large Language Models (LLMs) for Personalized Learning

Description (50 words max):

LLMs are powerful tools that can be used to personalize and enhance the learning experience. By prompting LLMs with specific questions and requests, students can obtain tailored summaries, outlines, definitions, flashcards, and practice questions. LLMs can also be used to assess student understanding and provide feedback. LLMs can also be used to bring methods like SQ3R into reality.

Tutorial for Use and Best Practices:

1. Survey (S)

a. *Goal Identification:*

Start by identifying your specific learning objective. What do you aim to learn or understand from the LLM-generated content?

b. *Content Selection:*

Choose the relevant source or document you wish to learn from. You can either select an existing source or input your chosen context into the LLM.

c. *Generate a summary and outline.*

Ask the LLM to provide a summary and outline of the content with headings and subheadings. This will give you an initial overview of the material.

d. *Usecase:*

Goal: I want to understand the basics of quantum physics.

Content Selection: Provide the LLM with a quantum physics textbook.

prompt: can you generate a summary and outline on topics like "Introduction to Quantum Physics," "Quantum Mechanics Principles," and "Applications of Quantum Physics?"

2. Question (Q)

a. *Question Generation:*

Use the LLM to generate a set of questions related to the content. This step encourages active engagement with the material and helps us focus on key points.

prompt: "Using the provided context from the given document, formulate questions that capture important facts from the context. Restrict the question to the context information provided."

3. Read (R)

a. Content Reading:

Engage the LLM to provide you with detailed information about the content. You can ask it to explain specific concepts, elaborate on key points, or provide practical examples.

prompt: "Can you explain the principles of quantum entanglement?"

b. Keyword Extraction:

Request the LLM to identify and define keywords from the content that require special attention.

prompt: "Identify and define the keyword 'superposition' from the context."

4. Recite (R)

a. Generate definitions:

If the LLM didn't provide definitions earlier, ask it to define the keywords you extracted during the reading phase.

prompt: "Please define 'wave-particle duality.' assuming I have no knowledge about it."

b. Create flashcards:

Use the notes and definitions to create flashcards for easy review and self-assessment of your knowledge.

prompt: "can you generate 10 flashcards from the context?"

5. Review (R)

a. Self-Assessment Test:

Formulate questions for self-assessment based on the content. These can be in the form of quizzes or practice questions to evaluate your understanding.

prompt: "generate 10 questions from the provided context that i can use to test my knowledge."

b. Summary Review:

Ask the LLM to generate a concise summary of the content. This will serve as a quick review aid.

prompt: "Can you generate a summary of the principles of quantum physics, restricting it to the context?"

c. Revisit Your Questions:

Go back to the questions you generated in the "Question" phase and answer them. This helps consolidate your understanding and retention of the material.

Review the questions you generated earlier and provide detailed answers.

Prompt: "Is this answer correct to the question 'duality of wave particle' and score me assuming you are a examiner"

We can also make the LLM read the documentation and prompt in this way, saving us the trouble of going through vast amounts of text to apply a specific technology in this example for

your particular use case. There are several apps that also build context from YouTube movies and other sources. "You are a Python developer; through the above documentation, you generate code for a streamlit app that takes audio files as input and saves them in files named uploads."

Impacts on Learning:

Positive Impacts:

There are several ways in which LLMs might enhance learning. LLMs, for instance, can assist students in improving their comprehension of difficult ideas. regain knowledge more successfully. Gain proficiency in critical thinking. Develop into more independent learners. Make techniques such as SQ3R a reality. Personal Evaluation using the context directly for a particular use case without having to read through it all

Limitations:

It is important to be aware of the limitations of LLMs. For example, LLMs can sometimes generate inaccurate or incomplete information. It is also important to be mindful of the potential for bias in LLM outputs. The answers generated by the LLMs are generated from various sources of information, which cannot be reliable at times. Hence, the LLMs should be used by training them on the custom data and then prompt ing engineersto get accurate results tailored for the purposes."

Ethical Considerations:

It is also important to remember that bias could be present in LLM outputs. The responses provided by LLMs are derived from a variety of sources, some of which are unreliable. In addition to providing inaccurate information, ChatGPT has limitations. The majority of its tools are paid for and difficult for students to access. Additionally, there are other options like Bard and Hugging Chat that are as effective as ChatGPT.

Even though they are incredibly helpful for analysis and generation, and they also save time, overusing them will result in a decline in human abilities such as creativity. Sometimes the tools' outputs might not meet the precise needs.

Therefore, in order to ensure accurate findings that are specifically customized to the needs of the engineer, LLMs should be trained on custom data. Many tools allow such actions.

The possible tools which can be used in the above tutorial to use the above mentioned SQ3R method

Tools:

Chat gpt is well known but there are better alternatives like Bard which is free and is trained on a massive dataset of text and code, scientific papers and mathematical expressions whereas chatgpt is trained majorly on large dataset of text but doesn't include code or scientific text.

*Bard generates chunks of text as response whereas chatgpt generates a single response
Bard also takes photos as input, it can also generate flash cards which can be exported to Excel
and bard cross checks its responses to ensure that they are apt and it always stays up to date
as it has access to the internet.*

*Unlike chatgpt, bard can be integrated for free on projects to create chatbots, query engines,
document summarizers etc. And it can also act as a tool for students to make their own
innovative study tool easily and efficiently*

*Example: a person can ask the bard to summarize the context on the latest issue like the
Ukraine war to prepare a report on it.*

*There are other alternatives like Claude ai and youchat.ai , Youchat takes a prompt as input
and returns queries and presents videos, websites and many more , like an ai powered search
engine. It retrieves websites, articles, videos, links to maps based on the given input just like
Google search does for a query*

*Youchat also has an additional feature of generating articles based on the prompt given.
Revisely ai is very beneficial in revising a topic, it generates flash cards, quizzes easily based
on the context given*

Link to an Example:

[<https://chat.openai.com/share/34a4e68a-f348-4070-a231-4c1bf8ca7291>]