Investigating Students' Competencies for Productive Use of Generative AI

A. Introduction

Background: Since the open release of generative AI at the end of 2022, AI software led by ChatGPT has become a significant source for college students seeking educational feedback (Dai et al., 2023).

Problems:

1. Generative AI has technical limitations.

AI hallucination: AI may generate content that appears to be reasonably coherent but is inconsistent with the input question or cannot be verified.

2. AI's responses differ according to the quality of prompts.

Therefore, students need certain capabilities to use generative AI efficiently.

B. Objective

1. To identify **essential capabilities** a student should possess for productive use of generative AI.

2. To summarize **useful strategies** for using generative AI from students' experiences.

C. Methodology

Stage 1: **Semi-structured interviews with seventeen students** (12 females and 5 males), each lasting 15-20 minutes.

Stage 2: **Transcribed** the recorded interview data.

Stage 3: **Thematic analysis** -- Searched for possible themes.

D. Results

*"While we can make reference to the response generated, we should **evaluate the ideas and arguments** and consider their correctness."*

Theme 1: Critical Thinking

- Judge the output's correctness using expertise
- Extract relevant information from the large amount of text.

*"I usually just keep the framework of the answer, instead of copying every detail from ChatGPT, since **many details are actually irrelevant** to my topic."*

The two most important abilities in using generative AI are utilizing critical thinking and employing self-assessment in prompt engineering.

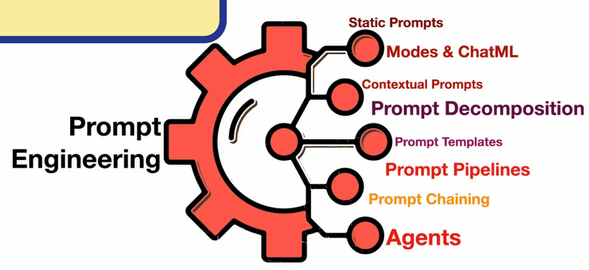
Theme 2: Cultivating self-assessment skills through prompt engineering

Generative AI is **no longer a passive receiver, but an active respondent**. It will adjust its output based on humans' prompts. Through self-assessment of their interacting performance, respondents summarized the following three useful strategies to improve the quality of prompt:

- **Structured:** writing prompts using a clear structure, which contains context, role assumptions, and output format.
- **Iterative optimization:** allowing the generative AI to assist in creating prompts for itself.
- **Asking step-by-step**

*"My ability to write prompts has improved through **constant interaction and practice** with AI."*

*"I think learning to use ChatGPT is like I'm gradually **communicating with a human being**."*



E. Limitations

- **Self-perceived competencies** of students may not accurately reflect their objective level in using generative AI.
- Future studies should include perspectives from a **wider range of professional backgrounds** to enhance its value, as the current interviewed group only represents some majors.

F. Conclusion

Generative AI has become an integral part of teaching practice in universities worldwide (Kelly et al., 2023). While there are studies that can present the potential benefits and drawbacks of these tools, few conclusions can be drawn about how students should engage with the practice.

By interviewing students' perspectives, this study helps to explore how to better utilize AI to facilitate university learning. **Respondents' experiences demonstrate the requirement for critical thinking and self-assessment skills, while also emphasizing the importance of prompt engineering.** These competencies should be further refined in the future to provide students with proper guidelines.

Student: Wang Youxiao, Year II
Department: Department of Sociology, Faculty of Social Sciences

Eureka supervisor: Prof. CARLESS David Robert
Department: Academic Unit of Social Contexts and Policies of Education, Faculty of Education

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