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HEALTHCARE INNOVATION DEVELOPMENT: EXPLORING THE IMPACT OF AI PROMPT ENGINEERING ON IDEA GENERATION

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ABSTRACT

AI has made a significant impact in healthcare fields such as drug development, radiology, pathology, and clinical diagnostics. However, within the healthcare sector, there is little research on the use of AI in order to foster new innovations. Moreover, despite the popularity of large language models, there seems to be an unquenchable demand for users skilled in prompt engineering, a technique optimizing AI outputs to enhance innovations in healthcare. Accordingly, this study aims to compare the efficacy of prompt engineering-trained users against others in generating innovative healthcare-oriented products or services. The focus is on how prompt engineering training influences the quantity and quality of ideas to enhance healthcare outcomes. Two hypotheses are proposed relating to the quantity and quality of healthcare ideas for users trained in prompt engineering when compared to non-trained users. Data analysis involves quantitative (total ideas) and qualitative (survey responses) assessments from both groups.

EXTENDED ABSTRACT

In recent years, AI has grown increasingly popular in healthcare and other domains. Healthcare has seen positive outcomes for using AI in areas such as drug development (Kulkov, 2023; Mak & Pichika, 2019), radiology (Hosny et al, 2018), pathology (Chang et al, 2018), and, increasingly, even aiding clinical diagnostics (Dias & Torkamani, 2019; Kulkov, 2023). In other industries, AI is being used as a powerful tool to generate new ideas and improve outcomes for business (Garbuio & Lin, 2021). However, there remains a tremendous need for users trained in prompt engineering, a technique used in AI for optimizing desired outputs, to use this tool to improve the quantity and quality of new innovations in healthcare.

Accordingly, this study aims to compare the effectiveness of users trained with a basic understanding of prompt engineering with other users in generating innovative ideas for new products or services appealing to healthcare providers. The research seeks to answer the question “How does training in AI prompt engineering influence the quantity and quality of potential business ideas for improving healthcare outcomes?” To that end, the following hypotheses have been developed:

H0: Prompt engineering training does not improve the quantity of ideas generated to improve healthcare outcomes.

H0: Prompt engineering training does not improve the quality of ideas generated for improving healthcare outcomes.

This study will take place in two phases. In phase one, participants will be randomly assigned to an experimental and control group. Both groups will watch a video on developing innovations in healthcare and the experimental group will complete a short training on AI prompt engineering. Both groups will then use either ChatGPT or BARD to research and develop their own ideas to improve healthcare using technology. Ideas will be submitted on a survey and will include details on the changes made from the AI output to make each idea unique. A leaderboard displaying total ideas submitted will be used during phase one to encourage participation in the competition. In phase two, all participants will vote on the top three ideas submitted. The final selection of the top three best ideas will be determined by a panel of experts consisting of physician assistants and university professors.

Data analysis will include ideas for improving healthcare outcomes from both groups using a mixed methods design of quantitative and qualitative measurements. Quantitative data will include the total ideas developed in each of the groups.

Analysis will consist of the statistical discovery of mean differences between subjects trained in AI prompt engineering and those who were not trained. In order to determine the quality of ideas related to the second hypothesis, qualitative data will be derived from the survey responses and will be evaluated based on an evaluation framework consisting of the following dimensions for each idea: effectiveness, safety, feasibility, acceptability, equity, ethical considerations, sustainability, evidence base, usability, and regulatory compliance.

Keywords *Prompt Engineering, AI, Idea Generation, Gamification*

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