

A Study of Creative Use of Generative AI

~ The Role of Domain Specific Knowledge ~

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Keywords

(1) Generative AI, (2) Media and Information Literacy, (3) Creativity, (4) Domain Specific Knowledge, (5) Feeling of Satisfaction.

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Research Overview

Media and Information Literacy (MIL) is recognized as a key competency related to the use of Generative AI (Gen-AI). This study examined using Gen-AIs among university students. Two hypotheses were tested: (A) The use of multiple Gen-AIs fosters MIL; (B) The way Gen-AIs utilized—specifically, prompt formulation—varies depending on the learner's level of domain specific knowledge, and higher satisfaction with learning outcomes is observed in topics where learners possess greater domain specific knowledge.

Regarding hypothesis (A), the benefits of using multiple Gen-AIs were found in the results, participants also demonstrated the ability to synthesize information by comparing outputs and integrating responses from different Gen-AIs. This process can be interpreted as aligning with UNESCO's framework of MIL. As for hypothesis (B), the study confirmed that prompt strategies differ depending on the learner's knowledge level, and that satisfaction with learning outcomes increases in domains where learners have more prior knowledge. Moreover, the findings suggest that when learners reach a level of understanding that enables them to articulate ideas in their own words, their sense of satisfaction tends to be even higher.

Purpose of Study

The purpose of this study is to examine how Gen-AI contributes to the development of creativity, MIL, and higher-order learning processes in higher education contexts. Recent educational discourse emphasizes that creativity and critical thinking are essential competencies for the AI era, particularly within digitally mediated knowledge environments. While Gen-AI has been widely discussed as a productive tool, fewer studies have investigated how learners cognitively engage with multiple Gen-AI systems and how such engagement influences creative thinking and learning satisfaction.

This study addresses two major research questions. First, it investigates whether the use of multiple Gen-AIs enhances MIL by encouraging learners to compare, verify, and synthesize diverse outputs. This process is interpreted as a form of reflective and evaluative literacy aligned with UNESCO's MIL framework. Second, the study examines how prompt strategies differ depending on learners' levels of domain specific knowledge. It explores whether learners with greater expertise demonstrate more sophisticated prompt construction, deeper critical evaluation of Gen-AIs outputs, and higher satisfaction with learning outcomes.

The study also conceptualizes Gen-AI as a cognitive partner that may support the transition from little-C creativity toward Pro-C creativity through iterative dialogue, reflection, and knowledge reconstruction practices.

Research Methods

This study examines how the concept of MIL can be introduced in research-based learning settings using multiple Gen-AIs between November and December 2025: ChatGPT, Gemini, Copilot, and Claude. Each manufacturer is developing different algorithms and employs different training data. As a result, outputs are not necessarily identical even when using the same prompt, and each Gen-AI has its own areas of strength.

81 national university students joined this study. Participants asked to solve two topics, (A) a topic with little knowledge (write an answer the mechanism of backpropagation of neural networks) and (B) a topic rich in knowledge (write an answer of issues of copyright issues in Gen-AI). Participants tackled the topics with team (three - five).

Participants were asked to answer following questions: (1) each knowledge level, (2) degree of satisfaction of answer participants had made, (3) how unitized multiple Gen-AIs, (4) reason of satisfaction participant had made in each topic. And, comparison which topic was more satisfied (A) backpropagation of neural networks or (B) copyright issues in Gen-AI, asked to write the reasons of choice.

Results and Discussion

The author analyzed the differences in satisfaction between (A) a topic with little knowledge (backpropagation of neural networks) and (B) a topic rich in knowledge (copyright issues in Gen-AI). As a result, 13 participants chose the low knowledge topic (backpropagation), while 68 participants chose the high knowledge topic (Gen-AI and copyright). The exact binomial test showed that the topic in the area of high knowledge was selected significantly more often ($p < .005$, effect size $g = 0.291$). A paired t-test was conducted on the knowledge levels of tasks in areas with limited knowledge (backpropagation) and tasks in areas with abundant knowledge (generative AI and copyright), resulting in $t(80) = -29.1$, $p < .001$, Cohen's $d = -4.03$. This suggests that the knowledge level for the backpropagation tasks was significantly lower than that for the Gen-AI and copyright tasks. Although the issues related to Gen-AI and copyright are relatively new social problems, it is considered that copyright-related issues were more familiar to university students than the mechanisms of generative AI.

The reasons for selecting the satisfaction which were evaluated high were visualized using a co-occurrence network for both tasks. First, result of (A) backpropagation showed that connections such as 'new, knowledge, words' and 'meaning, understand' were shown in the network. This suggests that learning new words increased satisfaction. Second, the author analyzed the reasons for selecting a task in a knowledge-rich domain (Gen-AI and copyright) using a co-occurrence network. Network connections such as 'investigate, understand,' 'easy to understand, main points,' and 'words, meaning, know' were shown. Corresponding statements included the following: 'The content on backpropagation, of which I had no knowledge, but for

copyright issues, the content was somewhat knowledgeable, easier to understand, and more convincing.'

Based on the descriptions of participants who selected tasks requiring prior knowledge, it appears that satisfaction levels increase when participants can answer in their own words using Gen-AIs. Furthermore, as seen in tasks requiring limited knowledge, learning new concepts also increases satisfaction, but it is suggested that satisfaction increases when participants can acquire new conceptual structures using their existing knowledge.