

Supporting Learners' Recognition of Habitual Actions Underlying Their Interests Using Generative AI

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Research Overview

In a VUCA era, learners are expected to identify problems, explore possibilities, and act autonomously in uncertain situations. Project-Based Learning (PBL) can support such competencies by encouraging learners to construct inquiries based on their own interests. However, learners do not always recognize the deeper action tendencies that underlie their interests. Their interests may appear as separate topics without being connected to broader behavioral patterns. This study focuses on these patterns as “habitual actions underlying interests,” meaning actions that learners tend to engage in repeatedly and spontaneously. This perspective was informed by studies on the Winnetka Plan, which suggest that teachers attended to children’s spontaneous play and preferred activities as clues for understanding and organizing their interests (Miyano, 2021, 2022). This study evaluates a generative AI application designed to help learners recognize such actions.

Purpose of Study

The purpose of this study is to examine whether generative AI can support learners in recognizing habitual actions underlying their interests. The study is based on two assumptions. First, identifying the roots of interest may help learners reinterpret their interests from a higher-level perspective and use them as a foundation for inquiry. Second, generative AI can present multiple plausible outputs rather than one fixed answer, and this variability can be educationally useful when learners actively select outputs that fit their own sense of self. This idea draws on prior work on “ambiguous AI outputs,” which suggested that AI-generated alternatives can help users notice new interests while maintaining their agency (Ogura & Shimada, 2024). In this study, generative AI is used not simply to recommend interests, but to help learners move from interest objects to action concepts.

Research Methods

The developed application has two main functions. The first function expands learners’ stated interests. When a learner inputs an interest, GPT-4o generates related keywords in three directions: similar concepts, subordinate concepts, and superordinate concepts. For each direction, 30 keywords are generated, and 20 are randomly selected and shown to the learner.

The learner then chooses the keywords that feel personally relevant.

The second function supports recognition of habitual actions. Based on the selected interest keywords, GPT-4o generates action-oriented concepts common to those interests. These outputs are expressed as Japanese action verbs or verb phrases, such as “exploring,” “analyzing,” “improving,” or “organizing.” Again, 30 candidates are generated, and 20 are randomly presented. Learners choose the actions that they feel correspond to themselves. This process shifts learners’ attention from individual interests to broader behavioral tendencies.

The application was evaluated with 17 graduate students in a teacher education program. After using the application, participants completed a questionnaire and provided free-text comments. The questionnaire examined the value of the newly identified interests and habitual actions. Referring to prior interest scales that distinguish emotional and cognitive value (To & Toyama, 2016), the items addressed enjoyment, attractiveness, concern, importance, and usefulness for personal growth. Responses were classified into positive and negative categories, and exact probability tests were conducted. Free-text comments were analyzed inductively. The relationship between selected interests and selected habitual actions was also examined qualitatively.

Results and Discussion

The questionnaire results showed that all items received significantly positive evaluations. For newly identified interests, participants evaluated them as enjoyable, attractive, and meaningful. For habitual actions, participants also evaluated them positively, especially regarding their usefulness for personal growth and their importance as a way of thinking. These results suggest that the AI-generated outputs were not perceived merely as random suggestions, but as having emotional and cognitive value for learners.

The free-text responses clarified the application’s effects. Positive comments were classified into three categories: visualization of interests, expansion of interests, and applicability to children. Participants reported that the application helped them visualize what they liked and encounter related interests they had not previously considered. Some also noted that the selection-based format could be useful for children and for setting inquiry themes. Negative comments were classified into usability problems, inaccuracy of AI suggestions, and other issues, indicating the need to improve interface responsiveness and the fit of generated action words.

The qualitative analysis showed that diverse interest objects were often reorganized into broader action concepts. For example, interests such as local food, education, and time management were connected to actions such as exploring, practicing, learning, and teaching.

Another participant's interests, including coffee roasting, snowboarding, statistics, mathematics, outdoor activities, and process optimization, were connected to analyzing, challenging, researching, improving, experiencing, and achieving. These examples suggest that the application can help learners reinterpret diverse interests as expressions of common action tendencies. However, some cases showed that interests were not easily converted into habitual actions, suggesting that learners should be able to revise AI-generated action words. In conclusion, ambiguous generative AI outputs can help learners recognize habitual actions underlying their interests, with potential implications for inquiry theme setting and PBL project design.