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The Impact of Games on Citizens' Awareness and Behavioral Change Regarding Decarbonization

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Abstract

As the importance of addressing global warming and reducing carbon dioxide emissions grows, achieving carbon neutrality requires not only corporate efforts but also a shift in awareness and behavioral changes at the citizen level. However, awareness of environmental issues among citizens, including younger generations, remains low, and practical actions are lacking. Therefore, effective approaches to promote decarbonization behavior among citizens are needed. This study aims to propose and evaluate the effectiveness of a new approach to foster changes in awareness and behavior toward environmental issues, particularly among younger citizens, through a quiz-style computer game. The game, which presents quizzes related to decarbonization and ranks players based on their accuracy, was developed alongside the creation of the decarbonization-related quiz content for the game. In 2023, a monitor survey and a post-experience questionnaire survey were conducted during the Toyo University Akabanedai University Festival to evaluate the effectiveness of the developed game (n=168). Additionally, two rounds of online surveys were conducted in February and March 2024 to assess trends in citizens' awareness and behavior regarding decarbonization (n=10,500). The results of the monitor survey showed a significant increase in environmental awareness among participants in their teens and twenties, with their willingness to engage in environmentally conscious actions increasing approximately threefold. Furthermore, nearly 90% of participants reported gaining new environmental knowledge through the game. These findings suggest that quiz-style games can be an effective means of improving awareness and behavior regarding environmental issues. A cluster analysis of the online survey results classified respondents into four groups based on their awareness and behavior. The findings particularly suggest that a targeted approach would be effective for those in the group with moderate awareness and low activity levels. Future plans include conducting follow-up surveys, including monitor surveys, to assess the long-term effects of the game and further improve its content.

Keywords: *Decarbonization, Environmental awareness, Behavioral change, Gamification, cluster analysis*

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