PROCEEDINGS OF ASIA DESIGN AND INNOVATION CONFERENCE
5–6 DECEMBER, 2024, SHANGHAI, CHINA

DESIGN AND PROTOTPYE TEST OF USER EXPERIENCE-CENTERED BIG-BOARD GAME FOR DESIGN EDUCATION

GyuHyeok CHOI, Woolahm YOON, Juyoung CHANG, Mijin KIM
Asia Design Center for Future, Dongseo University

ABSTRACT
Design is a discipline in which education is balanced between theoretical knowledge and practical skills for real-world application. However, skill-based education focused primarily on practical work may limit the diversity of educational experiences provided. In this paper, we developed game and a produced prototype to offer learners a more varied and engaging design education experience. Following the design, the prototype was created, and two rounds of testing were conducted. The designed Big-board game incorporates both biggame and board game elements, allowing students to physically engage in learning activities, which enhances interest and concentration. The results of this study serve as a valuable example that can be applied in various educational fields.

Keywords: Design Education, User Experience, Big-board game, Prototype Test

1 INTRODUCTION

Design education generally consists of theoretical education, encompassing historical facts researched over a long period as well as recent trends, and practical exercises based on these theories [1,2]. Over time, theory has become increasingly specialized, dividing into various fields such as Western art, Eastern art, art history, color theory, and form, with education delivered in these distinct areas. Following foundational education, design majors are divided into areas such as visual design, product design, environmental design, architecture, and sculpture, each offering specialized practical experiences. The focus on practical education in specific majors is widely adopted in design education due to its advantage in nurturing experts in each field. However, this practice-based education approach has the limitation of providing a narrow range of experiences. To broaden their horizons and gain diverse perspectives during their academic years, students need experiences beyond their major's practical work. Recently, using games or applying gamification in education has emerged as a method to offer new experiences beyond practice-based education [3,4].

Games and gamification are being applied not only in education but also in various fields such as marketing, healthcare, and finance [5]. Games, originally designed for human enjoyment and leisure, are now increasingly being adapted to make activities themselves enjoyable. By making the activity itself fun, they offer new experiences and stimulate users' interest. In this context, applying games to design education, which traditionally focuses on practice, provides students with diverse experiences and engagement, adding value to the educational process.

This paper aims to develop a game that can be applied to design education, providing students with diverse experiences and increased engagement. To achieve this, a hands-on Big-board game was developed by incorporating game elements into the appreciation of artwork. The game was produced as a prototype and underwent two rounds of user testing with the goal of producing a final product. The game is designed in the form of a board game, making it accessible to anyone and allowing multiple participants to engage simultaneously. The outcomes of this study have significance not only for design education but also as an example that can be applied across various educational fields.

2 RERATED WORKS

2.1 Design Education

Design education can be divided into two categories: traditional design education, which aims to cultivate professional designers required in the industry, and general design education, which focuses on enhancing design competencies as a general academic subject. This study focuses on the latter, with the aim and significance of helping students, regardless of their major, learn design methodologies and thought processes, thereby indirectly or directly acquiring the problem-solving approaches and perspectives of designers. Papanek, a renowned scholar in the field of design, asserted that design activities create new values in every aspect of human life, emphasizing that everyone should learn design [6]. Similarly, Cross viewed design as an innate human ability, regardless of one's major or age [7]. In line with this perspective, regions such as Europe, the United States, and Japan have expanded design education into the realm of general education, designing and implementing diverse educational programs across a wide age range.

In Korea, discussions on design education for various age groups began in the 2000s. Since 2010, as the importance of creativity has grown and societal demand for creativity-related skills has increased, design education aimed at enhancing creativity has begun to emerge. By 2012, university-level design education had already been implemented across the country. These programs, primarily offered as liberal arts courses, have fostered a broad understanding and appreciation for the value of design education as general education [8,9].

Design education in Korea can be categorized into the following types: (1) theoretical learning of abstract concepts related to creativity, creativity models, and design methods; (2) learning about historically recognized creative individuals, their ways of thinking, and life planning; (3) using methods such as creative problem-solving processes, brainstorming, mind mapping, and SCAMPER; (4) creative design projects conducted individually or in teams; and (5) case studies focused on environments that foster creativity, organizational structures, and idea generation [10].

Most current design education programs include courses related to creative problem-solving methods, as well as concepts and methodologies related to design thinking or service design. This educational approach, which emphasizes hands-on learning rather than complex theoretical study, reflects a broader trend toward intuitive, experiential activities in design education. In this context, it is clear that design education is shifting from abstract, conceptual knowledge toward experiential activities that are directly actionable. Following this trend, attempts to integrate new concepts such as multimedia and gamification into design education have been increasing. This study is part of that educational shift, presenting an experience-based Big-board game for experiential design education.

2.2 User Experience and Game

User experience (UX) refers to the comprehensive experience a user perceives and thinks about while interacting with a system, product, or service [11]. This experience is composed of all the sensations a human can feel, and even the same experience can vary depending on the situation. Users tend to seek new things over time, and those providing experiences must continually offer experiences that feel both familiar and novel. Since human sensations are fixed, people naturally seek new environments and situations. From an educational perspective, user experience can translate into learner experience, where monotonous and simplistic educational experiences can hinder the learning process. Therefore, in fields that require practical training rather than theory and application-based majors, it is essential to offer learners diverse experiences.

From this viewpoint, modern design education can be seen as offering very limited experiences. While design education provides more diverse experiences than theory-based and application-centered fields due to its focus on practical training, it still largely relies on text-based theoretical education that blends long-standing theories with the latest trends, along with practical education aimed at applying those theories to real-world work. This creates a narrow range of experiences for learners, which can negatively impact design students who need creativity and the ability to produce novel outcomes. Thus, there is a need to offer experiences that learners have not encountered before by changing the environment or learning methods.

Interest in games has been growing across various fields. Traditionally viewed as an activity for amusement or enjoyment, games are now being used in a range of domains to offer experiences like

“fun XX” (e.g., fun learning, fun work). Education is no exception, and games are gaining attention for enabling learners to acquire educational content while enjoying the process. In this study, we applied this concept to design education, aiming to engage learners in a game where they learn through play. This approach provides learners with new experiences and improves their interest and concentration.

3 DESIGN AND DEVELOPMENT OF BIG-BOARD GAME

3.1 Purpose and Scope of Development

The game developed in this study aims to offer a fresh and engaging design education experience by encouraging students to physically move, breaking away from the traditional practice-based education conducted within the classroom. In this process, artworks such as paintings or sculptures located within the school are selected as subjects, allowing students to naturally appreciate these works and broaden their design perspectives.

The development scope of the game is divided based on the activities carried out from the start to the end. The first activity is a biggame where students move around the school campus, appreciating artworks; the second activity is a board game where teams compete against each other through communication and collaboration.

The key element of the biggame is moving around the school campus. The school campus itself is used as the game map to structure the biggame. Students are tasked with finding and appreciating artworks scattered around the campus in a treasure hunt format. Finding these artworks is set as a mission, and students receive rewards for completing the task. These rewards are resources used in the second board game activity, linking the two activities together.

The board game is structured so that the first team to reach the endpoint from the starting point on the game board wins. The game is designed to be simple, encouraging competition between teams, with an emphasis on communication and cooperation within teams. This setup allows students to strategize with their teammates, fostering teamwork and collaboration.

3.2 Game Design

The content of the Big-board game is designed specifically for university freshmen. The game encourages students to find and appreciate artworks on the campus of D university, presenting it as a mission to enhance their interest and focus. As shown in Figure 1, the game is structured into four stages: 1) Preparing for the Game, 2) Playing the Campus Exploration Biggame, 3) Exchanging Game Resource, and 4) Playing the Board game.

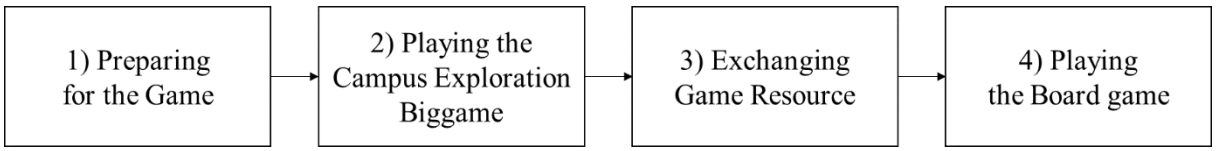

Figure 1. Structure of Big-board game

First, during 1) the preparation stage, the facilitator (instructor) organizes teams, distributes game guides and learner maps, and provides instructions and precautions. In the second stage, 2) the campus exploration biggame, students use the learner maps to explore the campus, appreciate artworks, and take photos of the artworks they find to verify their discoveries through mobile devices. Before moving on to the board game, during the 3) resource exchange stage, each team presents the artworks they found to other teams for verification using the artwork catalog on the back of the game guide and exchanges them for board game resources. Lastly, in the 4) board game stage, teams use their resources to create paths and guide their team characters from the start, through checkpoints, and to the finish line. Throughout this process, teams engage in strategic actions, such as communicating with their teammates to cooperate or hinder other teams.

3.3 Implementation and Results

The Big-board game was designed with a rectangular board, while the game tokens (roadblocks) were created in a hexagonal shape to allow flexible movement in various directions according to the board's size. The roadblocks were categorized based on the types of paths they could traverse, resulting in a total of 14 different shapes. The conceptual design is illustrated in Figure 2.

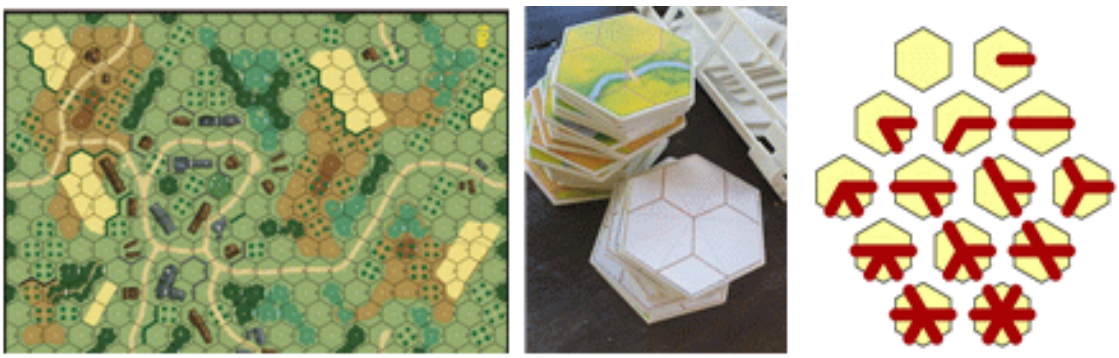

Figure 2. Board game Concept

A prototype was produced based on this concept, with the game board featuring a map of the school campus as the background, as illustrated in the left image of Figure 3. The Big-board game prototype was then tested, with a rule book in document form provided to assist participants during the testing process.

Figure 3. Board Concept and Rule book

The user participation tests, which were conducted twice, were carried out using the prototype, with a one-month interval between each test. After each test, feedback from participants was gathered, and the design of the Big-board game was revised and improved accordingly. Both tests were conducted with a minimum of 12 participants per team, along with the involvement of a moderator and two assistants to ensure smooth progress.

After the first test, feedback included comments that the game board was too dark and that the hexagonal guide lines were difficult to see. Additionally, participants noted that the explanation of the biggame in the rule book was hard to understand and suggested that the content be more clearly categorized. In response to this feedback, the brightness of the board illustration was reduced, and the hexagonal guide lines were made more prominent. The rule book was also revised by categorizing sections with different colors and adding illustrations to aid understanding. These improvements were applied to the prototype and reflected in the second test.

The second test proceeded in the format shown in the left image of Figure 4, with the rule book being provided as shown in the right image of Figure 4. After the second test, another round of feedback was gathered to verify whether the improvements from the first test had been successfully implemented and to identify any new issues.

Figure 4. Game Board game Testing and First revised Rule book

The most frequent feedback from the second test was the need to adjust the game board to balance the gameplay. The primary suggestion was to modify the shape of the board, while some participants also mentioned the need to adjust its size. Additionally, a few participants expressed confusion about the relevance of the campus map on the board to the actual gameplay. Another significant point of feedback was that the rulebook was too complex and difficult to understand. Participants suggested the need for a clearer distinction between the roles of the facilitator and the players, and requested that the rules be presented in a more visual format to enhance comprehension. Lastly, some participants found it challenging to locate the artworks required for the missions during the biggame. Most participants struggled to find enough artworks necessary to progress in the board game. They noted that the large size of the campus and the height of some buildings made it difficult to explore everything within the time limit. These comments were carefully considered, and revisions were made to both the design and structure of the biggame and the board game.

First, the game board was changed to a square shape, and the size of the roadblocks was adjusted accordingly. Based on feedback that the previously used campus map was not visually engaging, the final board design was updated with a conceptual design, and the board's size was revised to 70 cm. As the board size changed, the roadblocks were also resized. Secondly, the rule book was revised. In response to feedback that it was difficult to distinguish between the roles of the facilitator (instructor) and the participants (students), separate rule books were created for each role. The new rule books were made more intuitive, with a visual focus on explaining the rules, and excess information was removed, reducing the length from four pages to one. Lastly, a separate learner's map was provided to make it easier to find the artworks during the game, with added hints on the campus map for better usability. These improvements were incorporated into the design schematics and layout, preparing the product for commercialization. The final product has been developed into a physical board game package, much like commercially available board games. The components include a game board, facilitator's guide, participant's guide, game pieces, learner's map, and game currency (roadblocks), all neatly stored in a game box. The product is currently in the process of commercialization, and it is intended to be used as an educational tool in classroom settings. Specifically, the game will be utilized for design education by allowing freshmen to engage in artistic appreciation activities through the game's mechanics.

4 CONCLUSION

This paper aimed to develop and test a game to provide students with new and engaging experiences in design education, which has traditionally been centered on practical skills. The game was designed using elements from the appreciation of various paintings and sculptures located across the campus. The mission involved participants physically moving around the campus to find and appreciate these artworks, with rewards given in the form of in-game currency. This currency was then used to advance in the team-based board game. The biggame element was incorporated through the physical movement

around the campus, while team activities fostered communication and collaboration among members as they devised strategies to compete against other teams.

The designed Big-board game was developed as a prototype and tested twice. The initial tests revealed several areas for improvement, particularly in the game board and rule book, and there was a need to simplify the biggame process. After incorporating these revisions, the process of finalizing the physical product of the Big-board game is currently underway. The structure of this game, as an immersive and interactive experience, enhances concentration and engagement, and the team competition element helps generate interest. The integrated activities, from the biggame to the board game, allow students to form long-lasting memories of the artworks they encountered, providing a distinct experience compared to traditional design education.

This study focuses on the development process of an instructional tool aimed at broadening learners' design perspectives for use in design education. Therefore, separate evaluations of the game's effectiveness and usability are required. Verification experiments involving game experts, design experts, and general participants will be conducted based on the finalized product. Through these verification procedures, this study aims to provide a meaningful example that can be applied not only in design education but also across various educational fields.

ACKNOWLEDGMENTS

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2022S1A5C2A04093599)

REFERENCES

[1] Lim. C. A Study on the Current Status and Direction of Creative and Design Liberal Arts Education in Domestic Universities. *Design Research*, 2023, 8(3), 153-163.

[2] Park. T.W. The present status and directions of Digital Design Education in Design departments. *Journal of Basic Design & Art*, 2014, 15(6), 187-200.

[3] Mun. J. Choi. S. and Hyun. E. A Case Study on the Development and Use of a Board Game to Educate Children about Carbon Neutrality Using Service Design Methods. *Journal of the Korean Society of Design Culture*, 2023, 29(3), 129-139.

[4] Park. J. and Hong. H. Development and Application of the 'Art Board Game' to Enhance Empathy Based on Design Thinking–Focusing on the Case of the PED Program for the Gifted in Art–. *The Korean Society of Science & Art,* 2023, 41(4), 185-204.

[5] Kim. B. and Kim. M. Exploring Opportunities in Gamification Approaches for Special Education. *The Journal of Special Children Education*, 2020, 22(1), 57-79.

[6] Papanek. V. J.*Design for the Real World*, *Thames and Hudson*, 1972.

[7] Cross, N. *Design Thinking: Understanding How Designers Think and Work*, *Berg Publishers*, 2011.

[8] Bak. B. Effect analysis of the college students' creativity education using a libera-arts course. *The Korean Journal of Educational Psychology*, 2004, 18(2), 69-81.

[9] Lee. K. Lew. K. and Kim. E. The university students' perception on creativity education. *The Korean Journal of Educational Psychology*, 2010, 24(2), 327-346.

[10] Choe. I. Lee. H. Lee. G. and Kim. S. A detailed analysis of creativity courses provided by prestigious Korean universities. *The Journal of Curriculum Studies*, 2012, 30(2), 179-199.

[11] Seo. U. and Sun. S. A Literature Review on the Conceptual Exploration of User Experience. *Journal of Industrial Design Studies*, 2024, 18(1), 79-91.