

Research on the Pre-planning Process for School Space Innovation Project for Operation of High School Credit System



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Abstract In response to social shifts such as the evolving learning preferences of the digital generation, deepening social disparities, and the rise of new technologies, Korean educational facilities have pursued swift adaptations. Various initiatives have been advocated, including a five-year plan to enhance school facility environments, the school space innovation project, and the development of green smart future schools. A key feature of these endeavors has been the active incorporation of user-participatory design methods. By transitioning from a supplier-centric to a user-centered design approach, the intention to offer user-specific spaces within conventional school facilities has been affirmed. Consequently, this study scrutinizes the overall process of the school space improvement pre-planning program, using the Wonju Girls' High School in Gangwon-do case as a reference point. The purpose was to identify the limitations of participants at each stage and suggest directions for improvement, thereby suggesting the direction of the school space improvement project to be continuously promoted.

Keywords Space innovation project · Educational space · Participatory design · High school credit system · Gangwon provincial office

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1 Introduction

1.1 Research Background and Necessity

In recent times, educational facilities in Korea have been actively pursuing changes in both physical and non-physical environments. These changes stem from societal shifts, including the evolving learning preferences of the digital generation, increasing social disparities, and the demand for new skills in light of technological progress. Furthermore, the forthcoming implementation of the high school credit system starting in 2025 has prompted the promotion of various policies aimed at enhancing educational facilities to address these shifts [1].

1.2 Research Scope and Methodology

This study draws upon data collaboration with Wonju Girls' High School, previous research on school facility restructuring and the high school credit system, literature reviews including business reports, and field surveys. The research methodology involves several steps. Firstly, theoretical frameworks and the current status of the school space innovation project were examined. Secondly, the characteristics of each participating group, the attributes of each process, and the limitations were analyzed based on the case study of Wonju Girls' High School's school space innovation project pre-planning process. Thirdly, the characteristics of each process were derived through a comprehensive analysis of previous process outcomes. Finally, directions for future improvements of the project were presented.

2 Theoretical Considerations of the School Space Innovation Project

2.1 Promotion of Educational Space Change Policies Related to the High School Credit System

Concerns regarding the nation's future growth potential have emerged due to various uncertainties, including the 4th Industrial Revolution, the proliferation of infectious diseases, a declining birth rate, and a decrease in the school-age population. Moreover, social inequality is intensifying due to the evolving learning preferences of the digital generation, employment instability, and income polarization. Against this backdrop, rapid changes are occurring in the domestic education landscape, necessitating the cultivation of new talent capable of navigating future societal challenges. In April 2017, as a presidential election promise, the government announced the

“Promotion of High School Credit System Career Customized Education,” highlighting the need for a new educational environment tailored to this initiative. Consequently, the “School Space Innovation Project” was launched nationwide in 2019. This project focuses on renovating and refurbishing old school facilities using a student-centered, participatory design approach. In 2018, the Ministry of Education introduced the “Five-Year Plan for School Facility Environment Improvement,” followed by the establishment of a basic plan for promoting school space innovation projects in March 2019 [2]. Guidelines for project implementation were subsequently provided to support these initiatives. The School Space Innovation Project aims to transform standardized school facilities into diverse and flexible spaces that cater to evolving educational needs, including changes in curriculum, from the perspective of students who the future generation [3]. It involves actively promoting large scale environmental improvements for aging and outdated facilities within existing school buildings, as well as integrating school facilities with the local community. The project’s greatest significance was transition from the traditional supplier-centered design method to a user-participatory design approach. Through design workshops, users have the opportunity to express their opinions on design elements, which are then incorporated into the final designs. In July 2020, the introduction of the “Green Smart Future School” business plan was announced, aiming to cultivate future talent and establish eco-friendly, smart educational environments. Consequently, Korea’s education and educational facility change policies continue to evolve and expand. Consequently, there is a pressing need for research on educational facility environments and methodologies for transforming educational facilities to meet contemporary demands.

2.2 Pre-Planning for School Space Innovation

Historically, students have not been involved in the planning of school spaces. Before 1992, when the mandatory application of standard design drawings for school facilities was abolished, school spaces in Korea were uniformly designed using standardized drawings. Consequently, this approach proved inadequate in accommodating the unique characteristics and specific programs of individual schools, resulting in the creation of a significant amount of average school space tailored for general classes. In light of recent educational trends, there is an increasing need for classrooms that are tailored to the unique characteristics of schools and students, especially with the implementation of high school credit systems. Consequently, the school space innovation project has been initiated, incorporating the school space innovation design workshop as a key component to identify and integrate students’ spatial demands into the project [4]. School space innovation is a methodological innovation in that students actively participate in the design process of school facilities, and it is also a technological innovation in that it creates new and improved levels of school facilities suitable for students. Innovation will affect aesthetic expression, but the fundamental goal is to change the school space to suit the new curriculum and students’





lifestyles, and it could also improve the quality of teaching [5]. The workshop process comprises four stages, progressing from empathy among participants to design implementation. Step 1 involves empathizing and fostering mutual understanding. Prior to commencing the full-scale workshop, participants engage in activities aimed at establishing a foundational consensus on the future process through understanding and empathy. Step 2 entails idea generation. Participants collaborate to conceptualize space plans and explore precedents to establish the direction of design. Step 3 focuses on specifying and application. Ideas are visualized through simple 3D models, and specific designs are developed based on the generated concepts. Step 4 centers on deciding the final design. Participants engage in discussions and share completed models and ideas with other groups to propose enhanced space-planning solutions [6].

3 Analysis of the Pre-planning Process of the School Space Innovation Project Through the Case of Wonju Girls' High School

3.1 Pre-planning Project Overview

At Wonju Girls' High School in Wonju, Gangwon-do, the focus of this study, the research team led by Professor Hae-yeon, Yoo of Soongsil University's Department of Architecture has been responsible for the pre-planning project and has been promoting school space design since March 2023. This case represents one of the most recent examples of a school space innovation project in Korea. By delineating the roles of school participants and design experts, the significance and areas for improvement of the project can be identified, allowing for a comprehensive summary of the overall design process. As shown in Table 1, Most school space innovation projects typically take about a year to complete. After a school submits a business proposal, the selected school announces the project confirmation to the city, province, and local government approximately two months later. After internal consultation within the school, including selecting a person in charge and specifying the implementation stages for the project to be carried out, a preliminary planner to support the design process is selected. Usually, advance planners are people with experience in the field of design, such as professors, expert intellectuals, or design office directors in related fields, but in this case, Professor Hae-yeon, Yoo's research team from the Department of Architecture at Soongsil University was selected. The selected advance planner supports the overall design process from space planning to actual creation and completion of the space through continuous exchange with the school and design workshops for one year [7].

Table 1 Pre-planning project process

			
1. Selection of advance planner	2. Participant design workshop	3. Design office selection and actual design	4. Selection of construction company and construction/completion

(Source: Wonju Girls' High School High School Credit System School Environment Creation Project Management Service Report (2023))






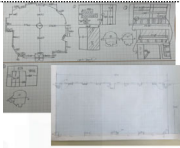


3.2 Design Workshop Process

For Wonju Girls’ High School’s design workshop, the process was decided through prior training and consultation after the preliminary planning research contract was concluded, and the full-scale workshop was held for about two months from May to June 2023. As a manager of the design workshop, this research team aimed to create a diverse and flexible space necessary for the operation of the high school credit system by assisting and promoting the entire participatory design process. The design workshop was divided into two groups, a student group, and a teacher group, and was held four times each, and was conducted as online and offline activities. To prevent concentration from being dispersed, we separated the facilitator group which is in charge of the teacher group from the moderator group which is in charge of the student workshop. This helps to keep the focus on improving workshop outcomes.

Students’ Group. As shown in Table 2, The first workshop introduced the design workshop process to students at Wonju Girls’ High School and identified current issues within the school through a field trip to explore the school space. Students independently toured the school, identified problems, and exchanged ideas for improvements, thereby fostering interest and participation in future processes. In the second workshop, students were taught how to read architectural drawings and practice space measurement methods, aiming to enhance their understanding of architectural drawings. During the third workshop, students selected spaces for improvement, developed concepts and programs, and expressed these ideas using collage techniques. Subsequently, ideas were further developed through sharing results within each group. The fourth workshop involved implementing ideas and concepts developed in previous sessions into a spatial 3D model. This participatory workshop process is meaningful not only because it reflects participants’ ideas in actual space design but also fosters continued interest and awareness of school facility issues, emphasizing that space can be improved.

Teachers’ Group. As shown in Table 3, In the first workshop, 10 teachers from Wonju Girls’ High School attended to understand the importance of the school space creation


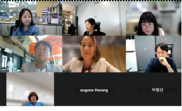
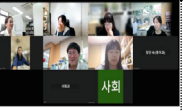



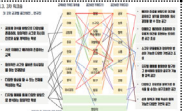

Table 2 Student group design workshop process

Step	1	2	3	4
Activity Images				
Activity Results				
Date	May 2, 2023	May 16, 2023	May 23, 2023	June 13, 2023
Goal	Understanding participatory space planning and design	Selecting a school space, measure it, and draw it	Planning a concept and program in the measured space and survey all students	Implementing the concept and program into a 3D spatial model

project and plan future activities. The research team delivered lectures on the comprehensive project implementation, conducted a school inspection to grasp the current status of the school space, and engaged in discussions regarding existing issues and im-provement directions. During the second workshop, 9 teachers from Wonju Girls’ High School participated online to establish requisite space corresponding to future curriculum needs. Curriculum restructuring and space linkage sheets for a total of 18 subjects were formulated. It was determined that lecture space, presentation class areas, team project zones, and collaborative learning spaces were required in order of priority based on curriculum restructuring. Additionally, the feedback provided by teachers regarding spaces outside of classrooms has been observed. In the third workshop, 10 teachers from Wonju Girls’ High School convened online to define the school’s representative vision and spatial vision, and to generate design concepts for each space using examples of various space typologies. By translating the teachers’ educational vision into a spatial design concept, space ideas for individual subjects were conceived. During the final 4th workshop, members were divided into two groups to present achievements to date and prioritize needs considering the budget. Rather than focusing on individual space improvement requirements, the emphasis was placed on improving the spaces most crucial to all school members. After extensive deliberations, the process of organizing necessary spaces in order of priority was undertaken.

As a result, the architectural ideas from students and teachers, generated through the workshop process, were organized into visual and textual formats to be integrated

Table 3 Teacher group design workshop process

Step	1	2	3	4
Activity Images				
Activity Results				
Date	May 2, 2023	May 23, 2023	June 8, 2023	June 13, 2023
Goal	Understanding the need for school space creation projects and identify activity plans	Establishing necessary space to respond to future curriculum through reorganization of curriculum for each subject	Establishing the school's representative vision and spatial outlook, and derive space design ideas through the analysis of various case	Establishing a school space improvement plan that connects the curriculum and responds to future education needs.

into the detailed design process. This workshop process is significant because participants without a background in architecture presented tangible architectural concepts thanks to the workshop-like curriculum.

3.3 Design Process and Construction

In March 2023, the research team at Soongsil University began analyzing the school’s physical and non-physical environment. Design workshops and an active collection of opinions from students and teachers encouraged participatory design. Based on these findings, detailed design drawings and budget allocations were finalized by December 2023. Subsequently, an architectural design office was selected through a private contract to execute the detailed design, As shown in Table 4 [8].

The research team was tasked with continually verifying and refining whether the planned design elements were incorporated into the design, while also consulting with school stakeholders. As of December 2023, the project is in its preliminary stage before full-scale construction, with completion targeted for February 2024, As shown in Fig. 1.

Table 4 Final design drawings and rendered images

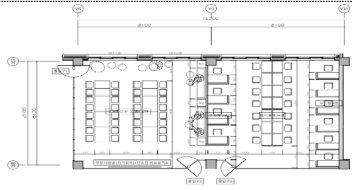
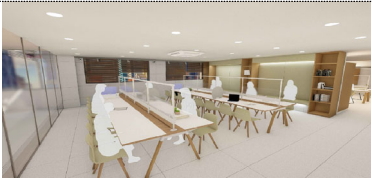
Division	Floor Plan	Image
4 th -floor study room		



Fig. 1 Wonju Girls' High School construction site (December 2023)

4 Proposal of Specific Measures to Expand User Participation in Pre-planning of School Space Innovation Projects

4.1 Teachers' Group

During the teacher group's design workshop process, two main characteristics emerged. Firstly, there were notable differences in the perceptions of space demands between the student and teacher groups. While the student group expressed a significant demand for diversified and expanded rest spaces, the teachers emphasized the need for improvements in teacher lounges, work facilities, and classroom spaces. There is a possibility of conflicting priorities for improvement within school facilities due to the differences in demands from different groups. Therefore, the two groups should have at least one shared idea session during the workshop process. Secondly, the teacher group's expectations regarding the extent of space improvements were constrained to a realistic level, taking into account budgetary and time constraints. To address this, it is important to foster active expression of creative ideas by analyzing various overseas school facility improvement cases. In the pre-planning stage of Wonju Girls' High School, the Insight Tour proved valuable not only for exploring best practices within Gangwon-do but also for studying similar cases in the Seoul region during vacation periods. Instead of solely seeking exemplary schools, it was essential to conduct an analysis to identify factors that must be incorporated into the school's design after completing a thorough process. Moreover,

it was crucial to broaden the perspective on architectural space beyond just school facilities. Exploring real cases across diverse fields such as culture, art, and information was instrumental in enriching the understanding of architectural space essential for school education.

4.2 *Students' Group*

The most notable characteristic observed during the student group's design workshop process is their tendency to limit the variety of required space. This tendency is likely influenced by their limited exposure to different school facility spaces. To address this, it's crucial to foster an environment of freedom and showcase numerous examples of various overseas school facilities to broaden their perspective and avoid constraining their ideas and proposals. Additionally, the student group shows a strong interest in visualizing their ideas. They require moderators such as architecture and design majors to assist them in this aspect. In the case of Wonju Girls' High School, it was very meaningful in that an architecture club was formed before the start of the semester, the role and purpose of the club were announced in advance, and interested students who would actively participate in the project were recruited. Furthermore, the students who participated in the project were evenly distributed across grade levels, and the students from all schools actively participated in the process, including conducting surveys and selecting priority areas for improvement, which contributed to the success of the project.

4.3 *Advance Planner*

In this project, the advance planner plays a pivotal role in the restructuring of school facilities through collaboration with various stakeholders, including school members, local government authorities, city and provincial education offices, design firms, supervision teams, and construction companies [9]. Seamless communication and continuous exchange between these entities and the advance planner are crucial for the smooth progression of this complex process. To ensure systematic execution, it is imperative to delineate the participating entities in each stage of the project promotion, along with the topics to be discussed and decisions to be made, with each entity taking responsibility for their respective arrangements. Collective awareness of these issues is essential among all stakeholders. The majority of advance planners face challenges executing processes and procedures, especially when working with limited budgets or when only one architect is responsible [10]. To facilitate a more dynamic and pragmatic pre-planning stage, it is suggested to increase the budget allocation at the local government and leverage the resources of local universities within the relevant jurisdiction.



Fig. 2 ‘Museum SAN’ docent program activities

4.4 Extended Program

If school members, such as students and teachers, continue to have an interest in architecture even after the pre-planning program, this can lead to continued interest in and changes in awareness of changes in the school space, which is their main activity area. In this respect, a regular architectural field trip program that allows students to continue to have an interest in architecture could be helpful. As part of the architectural field trip program, the Soongsil University research team conducted an architecture docent program at Tadao Ando’s Museum Mountain located in Wonju, Gangwon-do for about 10 students participating in the pre-planning program and students from the architecture club in August 2023, after the pre-planning program ended, As shown in Fig. 2. The program received a great response from students, and continued field trip programs are planned in the future.

5 Conclusion

The aim of this study is to propose future directions for improvement by analyzing the overall process of pre-planning for the school space innovation project at Wonju Girls’ High School in Gangwon-do in 2023. The findings revealed limitations in idea generation among both student and teacher groups, with discrepancies noted between their perspectives. To address this, facilitators need to creatively stimulate ideas, and a process for sharing opinions between the groups was deemed necessary. For advance planners, it is crucial to prevent unnecessary conflicts among project participants by informing them in advance that design opinions established during the pre-planning phase may not fully translate into the actual design due to budget, time, and architectural constraints. Furthermore, the cooperation and understanding of various stakeholders, including school members, local governments, provincial education offices, design firms, and construction companies involved in the pre-planning program, are vital for project completion. Therefore, there is a need to make clear the process of discussions, decisions, and roles of each participant, laying the groundwork for creating a restructured and improved school space that actively incorporates user feedback.

Appendix

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