An Educational Program through Multi-Organizational Collaborations on Design and Construction in Japan

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Abstract
We created an educational program for designing and constructing pocket parks in the city with transplanting the trees from satoyama, which is the Japanese word meaning the small hills preserved by the inhabitants. Our educational program is not abstract but forms actual parts of various town planning. The students, inhabitants and local professionals collaborate to build the pocket park every year as volunteers. The students have to deal with difficulties such as deciding concept and design on the actual project throughout the multi-industry collaboration with the inhabitants and the local professionals. The students are required to solve various problems during the actual construction process with inhabitants and professionals. These are deciding the trees and plants for the park according to the species in satoyama, discussing the detail designs for the pocket park, planning the process schedule for the construction and so on. The educational program provides the student with excellent opportunities to coordinate different opinions in these processes. For our educational program we have successfully created innovative frameworks such as the featured structure through this collaboration. We present our characteristic activities and the problems in the multi-industry collaboration process.

Keywords; city landscape, collaboration, pocket park, educational program

1. Introduction
This ongoing educational program was developed by Shin-ya Nishimura in collaboration with representatives of inhabitants, Sanjo City Hall and local professionals’ associations of Sanjo City in 2007 as an actual town planning effort to design and construct a pocket park every year. Sanjo City is a small city with population of 102,300 people, and located centrally in Niigata Prefecture, Japan. The city has both a downtown location and a hilly area because the city was merged with two neighboring towns in 2005. The sites of the pocket park are series of vacant land located beside pedestrian ways under an elevated railway line in the central area of the city. There are 11 vacant lands in 11 different districts in total (Figure1). These lands emerged when the railway line was constructed in 1997, and these were not used because the lands are unfit in shape for any architectural purposes. So the city decided to use 8 of these lands for development of a sustainable living environment so as to maintain the beautiful environment of Sanjo.

In the pocket park, a lot of trees and plants were transplanted from satoyama, which is the Japanese word meaning small hill preserved through the ages by the inhabitants of the city.
By transplanting trees and plants from satoyama to the pocket park, the inhabitants can feel connections between the park and satoyama, and changing seasons in the central area of the city. In Japan, there are a lot of town planning projects that collaborating city hall and students. However these projects are often just proposals of town planning and don’t include actual designs and constructions, or constructing temporary structures or spaces. In our project, graduate students of Niigata University, inhabitants, local professionals and city hall are collaborating throughout the design and construction processes of the pocket park. The parks indeed constitute part of the city environment, and our activity building the living environment in Sanjo little by little.

Figure1. Sites of the pocket park and satoyama
2. Annual activities of the program in 2013
This yearly basis project makes up a part of coursework of the Graduate school of Niigata University, with student awarded two credit points. Each year, 15 first grade students of the graduate school choose the program and two second grade students support them as a teaching assistant.

1. April to May - beginning of the activity
The satoyama and construction site used for design were different each year and it was decided before the start of the activity by neighborhood community associations and the city hall. They coordinated the satoyama and construction site with owner of satoyama and inhabitants who live near construction site. In 2013, they decided to use satoyama of Honai and the eastern-end site of the eleven sites. Professor and inhabitants of Sanjo gave instructions 12 Niigata University students about the program and site.
Then the students made four teams which paired with inhabitants to discuss and propose a design for the pocket park. Each team walked around both the central area and satoyama in the city to look for design material, for example, the history of the city and vegetation of the satoyama.

2. June to July - design development
The students and the inhabitants discussed ideas and concepts for the pocket park more than once. The students made drawings and models to share their perspectives and ideas. Design proposal for the pocket park should include drainage of rainwater, care for aged people and children, maintenance plan and planting plan with trees of the satoyama. In the midterm presentation, they got advice and indications from the local professionals from a technical perspective. Then they sorted out problems about the design and talked about alternatives for new ideas.

3. August - design competition
The students of each team presented their proposal to Sanjo’s inhabitants in the design competition. After the presentation, the students, citizens and local professionals had a question and answer session. Then, the models and presentation panels were displayed in the office building of Sanjo City hall, one of which was chosen by the citizens. After voting, the executive committee checked the winning design’s viability. The day after voting, a design for construction was decided in the executive committee. The students, citizens, local professionals discussed and identified problems for the construction in the committee.

4. September to March - design for execution and construction
After the deciding of the design for construction, the students additionally discussed with the professionals to rethink their design and to make detailed designs for the actual construction. Citizens, students and children collaborated on the construction work such as pavement, concrete placement, making tiles and transplanting supported by the professionals. This year, the students, citizens and children gathered and collaborated for the workshop to make handmade tiles that were used for parts of the pavement. All of the construction occurred on the weekend as volunteer work.

Our activity is totally volunteer work except for the costs of materials. Participation in construction is not compulsory and they attend the activity freely from each person’s stance. From 2007 to 2013, we successfully constructed seven pocket parks in Sanjo City. Citizens and students continuously maintain these parks, for example, growing plants, because the construction is the start of the growth of the plants (Figure2).
3. Characteristics of the structure of the collaborations on the project
This program is based on the multi-organizational collaboration with four agents; Niigata University, citizens, local professionals and Sanjo City Hall. Each agent is comprised of several individuals or companies who voluntarily participate in this town planning project, with agents contributing to the activity in different ways. For example, Niigata University students’ role is to propose a design of the pocket park and to promote it for an actual construction. The city hall supports the activity by making opportunities to discuss design, consulting with Japan Railways Company and preparing tools for the construction work. Citizens and civil associations supported students to find design materials such as history, life of citizens and vegetation of each satoyama. They also did maintenances of the constructed park, and advertised this activity for other citizens. Local professionals advised available materials and possible construction methods on each site. During construction, they volunteered with professional skills to construct the park on weekends. Moreover, citizens, Niigata University, civic associations, PTA made up an executive committee of the project. The committee held meetings to make decisions and determine policy in each section of the process.
With these collaboration structures, the activity proceeds every year. This collaboration structure with volunteering brings in both of advantages and disadvantages for our activity. On the one hand, the structure has a flexibility that can deal with changes in participants.
Students who take the program are changing every year, and some neighborhood community associations and local professionals are often changing their members because the activity is voluntary. To change members of the participants bring in new ideas to the activity. Also the volunteer works allow for the construction of the park with limited money, and it is necessary for the sustainability of the town planning effort.

On the other hand, the structure with volunteers makes some limitations and difficulties such as cost, materials, construction skills and finite supports from the participants. Each participant has own opinions, schedules and relationship with the others, so they are not necessarily give their full cooperation. Moreover, it sometimes happens that the area of local professionals’ skill is insufficient for the construction of the park. These advantages and disadvantages show parts of characteristics of the multi-organizational structure of our activity. Student participants design the pocket park in this environment and face to these difficulties through their design process (Figure 3).

Figure 3. Structure of the multi-organizational collaborations

4. The educational program on the multi-organizational collaboration

Throughout the process of the activity, we face several difficulties caused by its multi-organizational structure, with the students having to deal with these problems during the construction of the pocket park each year. On the other hand, this matter plays an important role in our educational program by providing the students with opportunities to experience management of an actual project.
4-1. Conflicting opinions
The students have to coordinate several opposing opinions throughout the process. The professionals’ opinions focus on the feasibility and ease of the construction, but the citizens’ opinions highlight usability and safety of the park as well as daily maintenance concerns such as watering for plants and sweeping paved areas. In this multi-organizational project, each participant has their own standpoint and they advice based on their own demands. For example, the shape of benches in the pocket park is one of contentious matter. It requires a relatively large cost and involved process to construct, so the local professionals seek a simple and small shape for the bench. Meanwhile the citizens required a safe shape for local children and something easy to maintain. The students held much discussion with local professionals and citizens to decide the alternative shape that balanced in a quality of the design and demands of the participants. They have to design and propose ideas aggressively, and at the same time have to find the point of compromise on their design of the pocket park with the volunteer work.

4-2. Materials and construction methods
During the execution design term, the students change the design of pocket park based on the discussion with professionals and city workers to actually construct it. This town planning project has several limitations on the collaboration structure. The project uses quite small budgets with participants’ volunteer work and local materials and techniques. The skills of participated constructors, materials and available plants from satoyama in Sanjo are limited and the local professionals are not necessarily sufficient to realize the detailed design, so the students are required to deal with these limitations. Therefore the students sometimes build a part of the park themselves, or look for person who has skills to make the needed parts of the park as a solution to deal with these limitations. In 2013, the student realized that the local professionals could not make a concrete formwork of the bench for the pocket park. They supplemented the organization of the construction by asking for Niitsu Technical High School's cooperation to build the formwork of the bench.

4-3. Management of the process schedules
The Niigata University students also have to plan the process schedule for the construction, with the volunteer work restricted to weekends only. Several workshops are held during the construction term such as making handmade tiles for pavement of the park and making seat of bench with local materials. The students have to organize these workshops in collaboration with citizens and children. In addition, unexpected happenings influence the schedule of the construction. In 2011, Sanjo was ravaged by heavy rain and flooding, so the activity was stopped to deal with the disaster. For these reasons, the process of construction has tended to be delayed every year, so the students and city worker frequently arranged a date to construct or prepare to construct. Coordinating the schedule to successfully carry out their design and to complete the construction of the pocket park is one of the major problems to be solved for the students.

Throughout these processes, the students were required to overcome several difficulties. They strove to solve the problems by creating alternative ideas, making some parts of the park themselves, scouting for persons who have feasible skills to construct and flexibly arrange date of construction. The solutions are different in each student, but their way of solving the problems are premised on the flexible multi-organizational collaboration structure, and sometimes they needed supplementing the collaborative organizations to solve the problems. In other words, to build a part of organization according to circumstances is needed for the educational program through multi-organizational collaborations. The students experience
opportunities to foster their responsibility as a professional by overcoming these difficulties throughout the educational program. This point clearly shows characteristics of our activity that has unique educational framework as an important part of the collaboration system.

Conclusions
This educational program based on the multi-organizational town planning project has the following characteristic structures of the activity.
1) Several organizations from different types of industry made up the town planning project, and these organizations are contributing to the activity in different ways.
2) A multi-step process (including satoyama walk, midterm presentation, design competition, executive committee and various workshops) was utilized to encourage citizens’ participation for the activity and at the same time to keep a quality of design of the pocket park.
3) The pocket parks are constructed through volunteer work of participants. Also, a system of cooperation and flexibility is needed to deal with unexpected happenings and changes of participants.

Through the construction process with these characteristic structures, the students are required to deal with several difficulties such as following problems.
1) Decide a concept and design of the pocket park while balancing and coordinating of conflicting conditions or demands from citizens, professionals and city hall.
2) Construct a detailed feasible design in line with limitations such as costs, local skills and materials available in Sanjo City.
3) Manage an ever-changing construction schedule to realize their goal of design of the pocket park.

These challenges provide students excellent opportunities to coordinate different opinions and to manage an actual planning project. Overcoming several difficulties on the process for students fosters responsibility as professional. This is a core element of the educational program for Niigata University students, and the processes to overcome these difficulties are unique characteristics of our program. Based on multi-organizational collaboration, this practical educational framework which forms a part of an actual town planning project is unlike any other abstract educational program in Japan.

References
[1] Nishimura, S., 2006, A designing and building educational program in collaboration among students, inhabitants and local professionals. 10th WCCEE