Abstract

Our group developed a town-reconstruction design game (the Machizukuri design game) and used it to create designs for Takeda-Nezaki, a district of a small castle town in Fukushima Prefecture. This paper reports our efforts to develop conference tools to aid community development by identifying and analyzing the spatial images generated by the Machizukuri design game. Our major findings and accomplishments include the following: 1. Some of the 39 spatial images developed using the reconstruction game were commonly shared by different game participants and were strongly related with each other. 2. We developed several image types to represent these commonly shared and strongly interrelated spatial images as conference tools for community design. 3. When these image types were used at a mock community design conference, almost all of the conference participants rated them as useful.

Keywords: community development; simulation workshop; design conference; Machizukuri design game; image type

1. Introduction

1.1 Background and Purpose

Japanese inner cities are flawed in many ways. In Edo period castle towns, for example, steps must be taken to improve living environments and accommodate motorization while preserving cultural heritage. Large-scale land readjustment projects are a useful way to upgrade infrastructure and solve these problems in inner cities. All too often, however, these projects can disrupt historical continuity. A better approach to these problems is to gradually renew inner-city districts while utilizing their historic resources such as their machiya (historic merchant houses) and kura (historic warehouses). In this paper I refer to this latter approach to urban problems as a stepwise improvement approach.

The stepwise improvement approach requires residents to find value in a city's historical resources, generate ideas for renewal, and proactively engage in a process of consensus-building to determine a target image for the community. Many Japanese cities are spatially disordered, however, and this leads to diverse and fragmented visions for the future among the residents. It can therefore be extremely difficult for residents to agree on a particular community design. Moreover, there are very few established frameworks for holding ongoing conferences in which residents, experts, and local authorities can come together for creative and collaborative dialogue. Those who engage in Japanese urban planning therefore need practical tools to help residents and other stakeholders hold conferences and develop shared visions.

To address this issue, my associates and I developed what we call Machizukuri design games (Satoh et al., 2005; Shimura et al., 1999, Sohda & Satoh, 1994). Machizukuri design games (hereafter, design games) are designed to assist resident participation in machizukuri (community development) in a workshop format. In essence, they are simulation games which allow residents (a) to see visual and spatial representations of their own target images and (b) experience the roles they would play in various stages of community design and planning through simulations. Our design games are the first to apply techniques (a) and (b). After developing the games, we used them at a community development site with active resident involvement. Once the participants had generated their ideas for community improvement, we compiled and integrated the ideas to create sample images, or image types, which could be used as future conference tools.

This paper explains the methods of the design games, analyzes one of the games, i.e., the reconstruction game, and discusses the effectiveness of the image types developed by the reconstruction game.

1.2 Methods of design games

The design games consist of two main techniques: (1) visual and spatial simulation of concrete spaces in community designs and (2) role-playing in the decision-making processes of community development (see Fig.1.). The visual simulation technique utilizes photos of 1/100 scale models of a district and buildings. (The images were recorded by a miniature Charged Couple Device (CCD) camera.) Workshop participants

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can move the models at will and see the visual and spatial representations of the future community design at eye level. The role-playing technique uses cards and panels as tools. The workshop participants live through simulated experiences of the roles they would play in the actual community design process (Sanoff, 1993).

By combining these two techniques, we created four different design games: the future image game, the picture collage game, the public street design game, and the reconstruction game. In the future image game, participants articulate and share ideas on improvements they would like to see in their community. In the picture collage game, participants put photo clips together to create a rough image of a future community. In the public street design game (Shimura et al., 1998), the software simulates the ideas of the participants with 1/100 scale models and displays them as miniature CCD camera photos. The participants in the public street design game actively examine, discuss, and negotiate their ideas. As shown in Fig.2., the reconstruction game has four phases: understanding the community's historic resources, goal-setting for the community development, designing the space and lifestyle of the community, and a final phase for debriefing and discussion. This game takes about two hours and gives participants an opportunity to generate and share ideas for their community's future.

1.3 Site and process

The site of this study was Takeda-Nezaki, a district of Nihonmatsu City in Fukushima Prefecture (see Fig.3.), about 250 km north of Tokyo. Nihonmatsu, a city of about 36,000, used to be a castle town during the Edo period. The Takeda-Nezaki district was formerly a merchants' district, but the local economy and population have been declining in recent years. The aging of the population and declining birthrate are the principal reasons for these declines. Modernization has been slow and a relatively large number of kura (historic warehouses) remain in the district.

Table 1. shows an overview of community development activities in the Takeda-Nezaki district.

In 1993, when a plan to widen the main street (a prefectural route running east to west through the middle of the district) was introduced, the community began a movement to revitalize the local economy, attract visitors and residents, and improve the landscape. Later, in 1997, the citizens established the Takeda-Nezaki Community Board and started to plan community development projects. The route construction began two years later, in 1999, just when the city undertook construction for improvements to...
the Koi River and a road for river management. In November of the same year, a group of architects living in Nihonmatsu city organized the Housing Research Group as an entity to contribute to the community development projects.

My associates and I began to assist with the community development efforts in Takeda-Nezaki in 1998. With support from the Fukushima prefectural government and the Nihonmatsu city government, we held a series of design game workshops for this district to help residents design the main street, plan out the townscape, and establish comprehensive plans. Two years later, in 2000, we held a session in the community to play the reconstruction game. Based on the results of this session, we developed a set of conference tools that we now describe as image types.

All of the workshops were held in the community development headquarters, an office established in 1999 and operated by the Community Board with support from Nihonmatsu City and our research groups. The Community Board has exhibited the result of workshops and built up a consensus among most of the landowners.

Fig. 1. shows the flow of this study. The second section of this paper briefly describes the four design games, then goes into more detail on the procedures of the reconstruction game and the method used to analyze the results from playing it. The third section reports the results of the analysis, while the fourth describes a set of image types we constructed by integrating the preferred spatial images of the participants. The fifth and sixth sections report and discuss the results of a participant survey after the workshops.

2. Implementation of the Reconstruction Game

2.1 Overview of the reconstruction game

In July 2000, we held a series of workshops to play the reconstruction game. Fig. 2. is the program for the reconstruction game made for the workshops. The participants played the game seven times over a period of three days. Among a total of 50 participants, 40 participated seven times over a period of three days. Among a total of 50 participants, 40 were residents of Takeda-Nezaki (see Table 2.).

The participants were divided into groups of six to eleven players. Each group consisted of five or ten Landowners and one Consultant (an expert who gave professional advice on reconstruction). Each game focused on the reconstruction of five lots in the district. (The first six games were played with five landowners, each controlling one lot. The seventh and final game was played with ten landowners, each sharing a lot with another). The Landowners in the game drew cards to determine their lots and their occupations as game players. The Community Board invited architects from the Housing Research Group to serve as the Consultants in five of the seven games played.

Three hypothetical blocks that reflected the actual features of the Takeda-Nezaki district were used to play the game. We called these hypothetical blocks the T block, N block, and S block. Only one block was used per game.

2.2 Procedures of the reconstruction game

Workshop facilitators explained the overall procedures of the game to the participants, and the game play was dictated by cards with instructions on the actions to be taken by the participants at various points of the game. The Landowners simulated reconstruction processes by moving the models of the buildings, while the Consultant gave expert advice to the Landowners. In the first game, the Landowners of lots 2 and 3 were the first to complete the simulated reconstruction process. Then the Landowners of lot 4, lot 1, and lots 4 and 6 followed. Fig. 4. illustrates the process and outcome of the first reconstruction game. (The block used in this game was the T block.)

Every time the game was played, the spatial images of each participant were influenced by the spatial images of the other participants. By the end of the game the participants had developed a shared image of a renewed block. In the course of the seven games played, the participants created seven images of the three blocks in the future (two images for T block, two for S block, and three for N block).

2.3 Analysis of the reconstruction game

All seven of the reconstruction games were videotaped and analyzed (see Fig. 4. for an example). We also analyzed miniature CCD camera photos of concrete spaces that the participants created with 1/100 scale models, as well as statements that the participants made during the games (see Fig. 5.). We identified 99 spatial images as a result of this analysis (see Table 3.). Since there were overlapping features and similarities among these 99 images, we condensed them into 39 images (see Table 4.). In the subsequent analysis, we found three types of relationship among these 99 images. These included:

- Development: X was proposed to add or strengthen the features of Y
- Problem-solving: X was proposed to deal with problematic features of Y
- Replacement: X was proposed as an alternative to Y

Table 2. Participants in the Reconstruction Game

| Times  | Date       | Hypothetical Block | Participants | Role                  |
|--------|------------|--------------------|--------------|-----------------------|
| First  | July 29th  | T Block            | 6 Landowners | Consultant            |
| Second | July 29th  | N Block            | 6 Landowners | Consultant            |
| Third  | July 30th  | S Block            | 6 Landowners | Consultant            |
| Fourth | July 30th  | N Block            | 6 Landowners | Consultant            |
| Fifth  | July 30th  | T Block            | 6 Landowners | Consultant            |
| Sixth  | July 30th  | S Block            | 6 Landowners | Consultant            |
| Seventh| August 1st | N Block            | 1 Landowner  | Consultant            |

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3. Shared Spatial Images and Their Relationships

3.1 Commonly shared spatial images

Table 4 shows the frequency of occurrence of the 39 condensed spatial images. Images with higher occurrences were commonly shared by the participants. The most frequently occurring image, A10, occurred six times. Next came three images (A5, A23, and A30) which occurred five times and four images (A7, A12, A21, and A36) which occurred four times.

The spatial image to "use the kura (historic warehouses) effectively" (A10) was the most frequent. Among all those focused on the kura, the image to "make the kura more aesthetically enjoyable" (A12) was also relatively common. With regard to the landscape of the main street, the images to "harmonize the tones of the buildings" (A5) and "set back the three-story buildings far from the street" (A7) were commonly shared. The images calling for the use of the machiya (historic merchant house; A8 and A9) were also relatively common. In terms of riverside reconstruction, commonly shared goals included "create an enjoyable river walk" (A23), "make buildings lower along the river" (A25), and "plant trees along the river walk" (A26).

For the parking facilities, commonly shared images included "share parking entrances with neighbors" (A30) and "build public parking lot" (A29). The
following images were popular for housing: "build pathways through the backs of lots" (A21), "build houses in the backs of lots" (A13), "avoid long buildings to ensure good passage of light and wind" (A17), and "have shared courtyards" (A20). At the block level, "build better sidewalks" (A36) was commonly shared.

3.2 Relationships among shared spatial images

Fig. 6 shows relationships among the spatial images. Though all of the images are interrelated in complex ways, some seem to be interrelated more clearly and directly. A30 and A5, for example, are strongly related since they share three relations of development in common. A30 also has two relations of development with A4 ("coordinate design of signs and ads"). This seems to indicate that the participants viewed the parking spaces as an important part of the landscape of the main street. A23 and A26 are also strongly related, with three relations of development in common. A20 has two relations of development with A21 and two relations of development with A36.

A21 and A10, as well as A34 ("create rest areas by parking lots") and A39 ("preserve or transplant old trees"), also have two relations of development.

4. Description of Image Types

This section describes the image types created based on the results shown in the previous section. These image types incorporate spatial images that were commonly shared by the participants. Among the images created, we connected those that shared strong relations of development. We also considered four themes of community development in the Takeda-Nezaki district when creating the image types. To make the image types easy to understand, we prepared and assigned them individually to lot units grouped as individual lots, pairs of lots, or trios of lots. Computer graphics were used to create three-dimensional representations of the image types. (See Fig. 7. for an example.)

Eleven image types were created (B1 to B11). Table 5. illustrates the image types by showing the original

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**Table 4. Spatial Images and Their Frequency**

| Code | Spatial Image                                                                 | Frequency |
|------|------------------------------------------------------------------------------|-----------|
| A1   | Build a coffee shop along the street                                         | 2         |
| A2   | Display merchandise in front of shops                                         | 1         |
| A3   | Create a space for rest at bus stops                                          | 1         |
| A4   | Coordinate design of signs and ads                                            | 2         |
| A5   | Harmonize the tones of buildings                                             | 5         |
| A6   | Create harmonious townscapes                                                  | 1         |
| A7   | Set back three-story buildings far from the street                           | 4         |
| A8   | Preserve the main building of shops                                           | 2         |
| A9   | Reuse old timber to build new three-story buildings                           | 1         |
| A10  | Use green effectively (e.g., as shops)                                       | 6         |
| A11  | Use kwasa as exhibition halls                                                 | 1         |
| A12  | Make kwasa more aesthetically enjoyable                                       | 4         |
| A13  | Build houses in the backs of lots                                             | 3         |
| A14  | Live close to parents                                                         | 2         |
| A15  | Make shopfronts more functional                                               | 1         |
| A16  | Make good use of land level differences                                       | 2         |
| A17  | Avoid long buildings so that light and wind pass through                      | 3         |
| A18  | Create courtyards or skylights to catch the sun                              | 3         |
| A19  | Create courtyards                                                            | 1         |
| A20  | Create shared courtyards                                                     | 3         |
| A21  | Build pathways through the backs of lots                                     | 4         |
| A22  | Protect privacy with hedges                                                   | 5         |
| A23  | Create an enjoyable river walk                                                | 1         |
| A24  | Build office space along the river walk                                       | 1         |
| A25  | Make buildings lower along the river                                          | 3         |
| A26  | Plant trees along the river walk                                              | 3         |
| A27  | Plant a row of cherry trees along the river walk                              | 1         |
| A28  | Create public space along the river walk                                      | 2         |
| A29  | Build public parking lot                                                      | 3         |
| A30  | Share parking spaces with neighbors                                          | 5         |
| A31  | Build porches on the ground floor of buildings                               | 2         |
| A32  | Build a parking space in the backs of lots                                   | 1         |
| A33  | Build parking spaces along the river walk                                    | 1         |
| A34  | Create rest areas by parking lots                                            | 2         |
| A35  | Create parking lots that can be used as open spaces                          | 1         |
| A36  | Build better sidewalks                                                       | 4         |
| A37  | Create an open space between the main street and their river walk            | 3         |
| A38  | Exchange pieces of lots to make better shaped lots                            | 2         |
| A39  | Preserve or transplant old trees                                              | 3         |
spatial images used in each image type in relation to the four themes considered for the community development of the Takeda-Nezaki district. Image types B1 and B2 correspond with the first theme, "revitalizing machiya," and include spatial images A12, A21, A17, and A13 ("make the kura more aesthetically enjoyable," "build pathways through the backs of lots," "avoid long buildings to ensure good passage of light and wind," and "build houses in the backs of lots"). B2 also includes images A23 and A26 ("create an enjoyable river walk" and "plant trees along the river walk"), commonly shared images with a strong interrelationship. Image types B3 and B4 correspond with the second theme, "utilizing kura," and include A10 and A21 ("use kura effectively" and "build pathways"). B3 includes A2 ("display merchandise in the shop fronts") and related images, while B4 includes A7 ("set back three-story buildings far from the street") and related images.

Image types B5, B6, and B7 correspond with the third theme, "dividing housing," and have no kura in them. B5 includes A21, A17 ("use kura effectively" and "avoid long buildings"), and related images. B6 and B7 include A25, A13 ("make the buildings lower along the river" and "build houses in the backs"), and related images.

Image types B8 to B11 correspond to the fourth theme, "cooperative reconstruction." Unlike the other image types, they consist of two to three lots. All of these image types include A5 ("harmonize the tones of buildings"). B8 and B9 include A30, A20, A21, A36 ("share parking entrances," "have shared courtyards," "build pathways," and "build parking spaces along the river walk"), and related images. B10 and B11 include A10 ("use kura effectively"), an image strongly related with A5 ("harmonize a tone"). B10 includes A34 and A29 ("create rest areas by parking lots" and "build public parking garages"). Finally, B11 includes A20 and A17 ("shared courtyards" and "avoid long

Table 5. Creating Image Types

| Code | Lot | Theme | Main street | Entry | Housing | River walk | Parking | Block |
|------|-----|-------|-------------|-------|---------|------------|---------|-------|
| B1   |     | Revitalization of machiya | A5 | A26 | A21 | A17 | A13 | A35 |
| B2   |     | Revitalization of machiya | A21 | A26 | A21 | A17 | A13 | A35 |
| B3   |     | Utilizing kura | A2 | A26 | A21 | A17 | A13 | A35 |
| B4   |     | Utilizing kura | A2 | A26 | A21 | A17 | A13 | A35 |
| B5   |     | Dividing housing | A21 | A17 | A13 | A35 | A35 | A35 |
| B6   |     | Dividing housing | A21 | A17 | A13 | A35 | A35 | A35 |
| B7   |     | Dividing housing | A21 | A17 | A13 | A35 | A35 | A35 |
| B8   |     | Cooperative reconstruction | A21 | A20 | A21 | A36 | A36 | A36 |
| B9   |     | Cooperative reconstruction | A21 | A20 | A21 | A36 | A36 | A36 |
| B10  |     | Cooperative reconstruction | A21 | A20 | A21 | A36 | A36 | A36 |
| B11  |     | Cooperative reconstruction | A21 | A20 | A21 | A36 | A36 | A36 |

Notes: Extra (blue type) = Frequency is less than two times
Strong (red type) = Frequency is more than three times
Relationship of "Development":
- Strong relationship
- Relationship of "Development"
buildings"), images strongly related with A10 ("use kura effectively).

5. Discussion of Design Games and Conferences for Community Development

The participants were given questionnaires asking them to evaluate the design games and identify the conference tools and methods they needed. Nineteen of the participants completed the questionnaire after participating in the games.

5.1 Evaluation of the design games

Fig.8. summarizes the questionnaire assessments of the design games. Among the survey respondents, more than 70% of Landowners and about 80% of the Consultants (experts from the Housing Research Group) found the design games useful as simulations of community development and reconstruction. More than 80% of the Landowner respondents indicated they were able to interact very well with the other Landowners during the games. Most of the Landowners and Consultants also indicated that they were able to interact well with each other.

5.2 Needs for conference tools and conference methods

Fig.9. summarizes the responses to the questions on the conference tools and conference methods. Among the surveyed respondents, almost all residents and experts indicated that they needed some type of conference tool, such as a guideline for reconstruction. When asked to rate what they would need for effective conferencing, "dialogue among residents, experts, and local authorities" scored the highest among both the resident respondents and expert respondents. "Guidelines for reconstruction in writing with photos" scored the second highest.

6. Effectiveness of Image Types

Drawing upon the results of the survey discussed above, we held a mock design conference at the Takeda-Nezaki district. The image types we developed were used as conference tools. After the mock conference, participants answered a questionnaire on the use of image types. This section describes the conference and the results of the questionnaire.

6.1 Mock conference with image types

The mock design conference was held in October 2000 as an activity to enhance dialogue among residents. The image types and miniature CCD camera photos from the reconstruction game were used as conference tools.

Seventeen people participated in the conference. Some were Landowners or Consultants, playing the same roles assigned in the reconstruction games, while others served on a hypothetical Townscape Committee, a group responsible for planning the reconstruction and holding design conferences. The members of the Townscape Committee presented the image types as sample images during the conference, and the participants used the image types to discuss target images for community development. The mock conference took about two and a half hours.

6.2 Evaluation of image types

After the mock conference, 14 of the 17 participants filled out a questionnaire to evaluate the image types (see Fig.10.). Most of the respondents answered that they would like to see the image types used for the planning of the community reconstruction. Many of them also indicated that the reconstruction expressed by the image types would be desirable for the Takeda-Nezaki district.

7. Summary

This paper has introduced a set of Machizukuri design games developed for and applied to the Takeda-Nezaki district in Nihonmatsu City, a small castle town in Fukushima Prefecture. It also has reported the process used to create conference tools for community development by identifying and analyzing the spatial images generated by a reconstruction game. Our major findings include the following:

1. Among the 39 spatial images that came out of the reconstruction game, some were commonly shared by the game participants and had strong relationships with each other.
2. To provide conference tools for community design, we developed a series of image types which represented commonly shared and strongly interrelated spatial images.

3. When these image types were used at a mock community design conference, almost all of the conference participants found them useful.

In December 2001, after great efforts by residents, Takeda-Nezaki district concluded a townscape agreement that drew upon the findings of this study. The district has been holding an ongoing townscape design conference with support from the Housing Research Group since that time. The district is now being reconstructed and its historical resources are being revived.

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