Characteristic Space Planning of Indoor Playgrounds in Snowy and Cold Regions

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Abstract
In Hokkaido, a snowy and cold region of Japan, indoor playgrounds that allow children to play in an outdoor atmosphere have been growing in number. The important characteristics of space planning were clarified through the study of nine major indoor playgrounds and detailed analysis of three selected cases. Such indoor playgrounds serve as gathering points for people from a diverse range of generations, including infants, elementary and junior high school students, parents, grandparents, and groups. They provide a space that encourages various activities of not only children but also adults. The important space characteristics that enhance the environment for example are the consideration of various physical activities, proximity of play area and rest area which allow easy visual contact, appropriate relationship between the indoor playground and outdoor play area to encourage outdoor activities, and considerations for group.

Keywords: play environment; indoor playground; mixed generation; regional facility; snowy and cold region

1. Introduction
1.1 Background
Improvement of the quality of children's play environments is an important issue in Japan, where the trend toward nuclear families and the decline of the birthrate have both increased along with the general aging of society. Open spaces where children can play have been put to other uses in urban areas, and more children attend cram schools or participate in other activities at the expense of unstructured free time. In addition, traffic accidents involving children and crimes against children have been increasing nationwide. Therefore the number of children playing outdoors in parks is decreasing in Japan, even though playing outside is very important for children. The government has promoted and encouraged children's community houses across the country. In addition, there has been a rise in the number of privately operated indoor play facilities where children can play safely; these have gained popularity in metropolitan areas.

Given the above trends, in the cold and snowy regions of Hokkaido, where playing outdoors for long periods of time is restricted, all-weather indoor playgrounds that allow children to play in an outdoor atmosphere have been growing in number.

1.2 Objective
Indoor playgrounds in cold and snowy regions have unique characteristics that are different from those of the existing children's community houses. They serve as gathering points for people across a range of generations, including infants, children, parents, grandparents and groups, year-round. In addition, some have been successful in encouraging children to play outdoors in winter. The relationship between each type of space greatly influences such activities. The purpose of this study is to elucidate the important spatial characteristics that give rise to and promote favorable conditions of such indoor playgrounds.

2. Research Methodology
There are nine major indoor playgrounds located in Hokkaido, a cold and snowy prefecture in Japan. Seven of them are located in regional parks, and two are located within the inner city. The basic conditions of the nine playgrounds were studied through discussions with the administrators of each facility. Three facilities were selected as cases for subsequent investigation. Observational research of the three facilities was performed in both the winter and the summer in 2005. Various activities in the indoor playgrounds were recorded and categorized and the characteristics of space planning that promoted the activities were then investigated.

There are many previous studies concerning play environments such as children's community houses and parks in Japan. However, there are few studies on indoor playgrounds in cold and snowy regions, as far as we know. A series of studies1) by Senda provides essential information on the spatial characteristics that encourage children's play activities in Japan. Regarding the play environment in Hokkaido, Kitagawa and...
Kato\(^2\), found through research conducted in Sapporo City, that the number of children who play in parks in winter in residential areas is decreasing. Takahashi and Ogaki\(^3\) pointed out that many mothers desire a facility where children can play in the winter, on the basis of a questionnaire survey in both urban and rural areas in Hokkaido. The aim of the present study is to elucidate the effective spatial characteristics of indoor playgrounds in snowy and cold regions, and to contribute to raising the quality of future indoor playgrounds.

3. Overview of Indoor Playgrounds in Hokkaido
The nine major indoor playgrounds in Hokkaido are shown in Fig.1. ① was founded by the national government and is located in a large forest park. ② and ③ were founded by the prefectural government and are located in large regional parks. ①, ② and ③ are intended to be used by people throughout a wide geographical area. ④, ⑤, ⑥, ⑦ and ⑧ were founded by municipal governments. ⑨ was founded by a rural village. The indoor playgrounds in Hokkaido are founded by different levels of administrative organizations.

In addition to the above cases, there are many traditional children's community houses, which are promoted and supported by the government, nationwide. Several civic gymnasiums in Hokkaido also have children's playrooms. However, the indoor playgrounds shown in Fig.1 have different spatial characteristics from those of other facilities; they allow children to play in an outdoor atmosphere. They all have high ceilings of two stories or more, and ①, ③, ⑦ and ⑧ have roof skylights; ②, ④, ⑤, ⑥ and ⑧ have high side-lights; ②, ③, ⑤ and ⑥ have large glass screens and doors that allow easy access to the outdoor area. In addition, ②, ③, ④ and ⑦ have artificial lawns as the floor material, ⑤ has a soil ground surface, and ⑥ has sand on an artificial lawn. These indoor playgrounds are designed as all-weather plazas where children can play even during the cold season.

The indoor playgrounds are in different types of settings, as shown in Fig.2. ① and ⑦ are for exclusive use as playgrounds. ② and ③ are indoor playgrounds in the visitor's centers of the regional parks. ④, ⑧ and ⑨ are part of a complex with other facilities: ④ is attached to a public pool and communal bath, ⑧ is attached to a science museum and lifetime learning facility, and ⑨ is attached to a local toy museum. The main functions of ⑤ and ⑥ are as indoor gymnasiums, and the children's play area is set up in the gymnasiums mainly on the weekend. There is a variety of settings of indoor playgrounds in the snowy and cold regions of Hokkaido.

4. Detailed Study of Three Cases
4.1 Locations and types of indoor playgrounds
Detailed observational analysis of three indoor playgrounds by two observers was implemented. As shown in Fig.3., three indoor playgrounds were selected as representative cases of each type in Fig.2.; exclusive use, mixed use and complex.

Case A in Fig.3. is Wakuwaku-Egg in Kamuinomori Park (⑦ in Fig.1.), which was founded and is managed by Asahikawa City, a local hub and the second largest city in Hokkaido. It is exclusively an
indoor playground. Case B is in the visitor's center in Yumenomori Park at Nakashibetsu Town (③ in Fig.1.), which was founded and is managed by the Hokkaido prefectural government. The space is used as both the administrative office and information center of the park, as well as the indoor playground. Case C is Relax Plaza in Kawashimo Park (④ in Fig.1.), which was founded and is managed by Sapporo City, the prefectural capital of Hokkaido. It is a complex that contains an indoor playground, public pool, communal bath, and the administrative office of the park.

All three playgrounds have similar basic functions of a play facility for children, even if the degree of complexity of each facility is different. They are also all used by local residents and are free of charge for the use of the indoor playgrounds. Therefore, Cases A, B and C are appropriate examples for analyzing the important spatial characteristics of indoor playgrounds in the snowy and cold regions of Hokkaido.

4.2 Basic zoning of indoor playgrounds

The basic zoning of the main floor of each facility is shown in Fig.3.; all of the facilities are located in regional parks.

As Case A is used exclusively as a playground, the relationship between zones is simple. The facility does not have a canteen. The staff desk is in a corner of the indoor playground and the staff sometimes watches over the indoor playground. Case B has a canteen and a multipurpose meeting room. The administrative office is next to the indoor playground. Therefore, the staff can easily supervise the play area, and children can stop by the office. Case C has a public pool, a communal bath, and a canteen in addition to the indoor playground. The administrative office is not next to the indoor playground, so the staff must supervise the playground via a monitoring camera. Concerning the degree of monitoring, Case C has a relatively low level compared with Cases A and B.

4.3 Relationship between indoor playground and outdoor play area in summer

The positional relationships between the indoor facilities and the wading pools, which are very popular in summer, are shown in Fig.4. Case A has a wading pool next to the indoor playground, with a wide wooden deck under a canopy connecting the two areas. Many families rest there in the summer. As the sunshine in the summer is strong even in Hokkaido, shade is necessary to rest comfortably. Case B also has a wading pool next to the indoor playground, but it does not have a connecting structure between them, such as a canopy or eaves, so parents who are watching their children must stand beside the wading pool. A wooden deck and proper shade adjacent to the playground will be effective in promoting harmony among families.

For Case C, there is a wading pool in the same park, but it is located about 120 meters away from the indoor facilities, so there is little relation between the

4.4 Relationship between indoor playground and outdoor play area in winter

There are many kinds of winter recreational activities in cold and snowy regions, such as skiing, skating, sledding, snowball fighting and making snowmen. However, the number of children who play
at parks in winter is generally decreasing in Hokkaido. There are few children who use the parks in winter in Cases A and C, as shown in Fig.5. In both cases, there are flat parks around the facility, and most of the outdoor play equipment is covered by deep snow.

| Case A | Case B | Case C |
|--------|--------|--------|
| Date: 2005 February, Saturday | Date: 2005 February, Saturday | Date: 2005 February, Saturday |

The outdoor play area is covered with deep snow. Few children play there. The grass slope next to the facility becomes a sleighing area. The sleigh slope is far from the facility. Few children play in the flat area.

(Observation on a sunny weekend in winter)

Fig.5. Condition of outdoor play area in winter

However, Case B has a slope for sledding in winter, and provides free rental sleds, so many children can play on the slope; some of them make snowmen and enjoy snowball fighting (Fig.6.). If they become too cold to continue to play in the snow, they can easily return to the indoor playground. As children can use the indoor playground to warm their bodies, they can play on the outdoor slope repeatedly, even on very cold days. The combination of the slope for sleds and the indoor playground is effective in promoting winter play activities.

4.5 Play activities in indoor playgrounds

Fig.7. shows the characteristic activities observed in indoor playgrounds A, B and C. In addition to the observations, we interviewed the facility administrators concerning issues in playgrounds.

Even though they have different levels of complexity, the indoor playgrounds of these facilities have similar characteristics, such as attractive play equipment and play areas that allow various physical activities, a high ceiling above the play area, and an open atmosphere similar to that of a small park.

However, the number and types of play equipment are considerably different among the facilities. Consequently, the ways in which the playground is used differ for each case. In Case A, the playground is mainly for running, playing with balls and large cushion blocks (A-3, A-4). Large wooden play equipment is located in a corner of the playground in an area that resembles a fort (A-1, A-2). A large net hangs from the ceiling, on which children can climb and wander around and explore (A-9). In Case B, the central area of the playground is mainly used for riding tricycles (B-2). A variety of play equipment is located in the area around the playground (B-1, B-3). A long slope that surrounds half of the playground connects to play equipment such as large slides (B-4). In Case C, play equipment is placed in a corner of the playground in an area that is like a small house (C-1). Children often play with soft rubber balls which are obtained by the parents at the playground (C-2, C-3). There is a running track on the second floor, and a gentle slope connects it to the playground (C-4, C-9). In addition to the planning of the playground, the selection of play equipment provided is very important in determining whether children actively play.

Fig.8. shows the characteristic activities of parents and grandparents in the three indoor playgrounds. Concerning the parent’s activities, similar characteristics are observed in the three indoor playgrounds. As shown in Fig.7., it is common in the indoor playgrounds for many parents to actively play with their children (A-2, B-4, C-3). The father and mother often take turns to play with their children, and it is particularly encouraging to see fathers play with their children. Some mothers hold their babies while watching the older siblings play (A-8, B-6, C-8). Grandparents commonly play with and support their grandchildren in the playground, as shown in Fig.9. Some groups comprised parents, grandparents, and children, who were all enjoying a lively time together as a family. In addition to these cases, some children were accompanied by their grandparents in place of their working parents (A-10, B-9).

In the indoor playgrounds, instances where mixed generations play together were notable. In Case C, an elderly woman also walked along the running track on the second floor for her health (Fig.9.). The running track is for multiple use in the complex facility for both children and elderly persons. Consideration for a diverse range of people is necessary for the indoor playground to function as a communal space.

4.6 Relationship between rest area and play area

There are clear differences between the three facilities regarding the location of rest areas, as shown in Fig.7. Relationships between the playground and rest area are shown in Fig.10.

In Case A, the rest area where eating and drinking are permitted surrounds the playground. Therefore, children can easily stop by the rest area for refreshments. It is also easy for parents to look after babies in the rest area while watching children in the playground. Child-rearing groups often have indoor picnic lunches in the rest space. On the other hand, in Case B, many parents sit on benches or on the floor within the playground. The canteen is located next to
Fig. 7. Various activities at the indoor playgrounds

Fig. 8. Activities of parents and grandparents

Fig. 9. Characteristic activities of grandparents
the lobby area, and food and drinks are prohibited in the playground area. Consequently, if somebody in the family becomes thirsty, they must leave the playground temporarily. In Case C, the rest area where eating and drinking are permitted is next to the playground. However, as there is a corridor and concrete columns between the rest area and the playground, visual contact between the two areas is restricted. There are not enough benches in the playground, so many parents who want to watch their children must stand or walk around in the playground. The canteen is located next to the indoor playground; it is at the center of the facility and connects the playground, pool area and the communal bath. However, many parents bring their own lunches and eat in the rest area and are able to have a relaxing time.

In the indoor playgrounds, the relationship between the play area and the rest area was found to be an important issue. Close proximity between the two areas means that children can easily take a break and hence can continue to play for a long period of time. In addition, close proximity between the play area and the rest area enables parents to support small children from a suitable distance. It also encourages the parents and grandparents to participate in the children’s play activities. As shown in Fig.10., the space planning of Case A is very simple and there is no canteen, but it has the closest proximity between the two zones, which is important for this kind of communal space.

In the interview of administrative staff of Case A, few people expressed concern that there is no canteen in the facility. It seems that a canteen is not a critical amenity of the indoor playground there. In the interview of administrative staff of Case B, it was found that many parents complained of the lack of a visual relationship between the playground and the lobby area where eating and drinking are permitted. Administrative staff of both Case B and Case C stated that many parents bring lunches even though there is a reasonable canteen (Fig.7.; B-7, C-5).

These statements made by parents indicate that careful planning of proper rest areas, as well as of the playgrounds, is necessary. In addition, groups of children from kindergarten or nursery school often come to the indoor playgrounds. In the case of such large groups, the separate meeting room facility of Case B is useful for them to have their lunch. In Case B, the meeting room is also sometimes used by volunteer groups for reading to children. Such an extra room is effective in encouraging variety in the use of the facility.

5. Conclusion

Indoor playgrounds can serve as gathering points for a diverse range of people, including infants, elementary and junior high school students, parents, grandparents and groups. In an aging society with fewer children, the gathering of a variety of people in the communal open areas that these playgrounds provide is very important. These playgrounds provide a space that encourages various activities of not only children but also adults. The important characteristics of spatial planning that promote favorable conditions are as follows.

1) Consideration for a diverse range of people, such as attractive play equipment and a plaza which allows various play activities.
2) Appropriate location of staff room, which allows direct contact between staff and visitors.
3) Close relationship between play areas and rest areas with good visual contact between children and parents.
4) Appropriate relationship between play area and eating area where families can relax while children play.
5) Preparation of versatile rest space for group use, such as by child-rearing groups and preschool classes.
6) Close relationship between the indoor playground and outdoor play area such as wading pools or sledding slopes, to encourage outdoor activities.

The gathering of a variety of people that these playgrounds promote is meaningful not only as a play environment in cold and snowy regions, but also as a regional facility for a mature society. The important characteristics of indoor playgrounds from the perspective of the social environment have significant meaning. Further possibilities for planning include such playgrounds in other settings, such as within mixed residential facilities, which will enhance the resident’s amenity in an aging society with fewer children.

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