

auri research brief

No. 29

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A Study of Design Guidelines for National Daycare Centers

Introduction

A daycare center is the first educational institution for children from 5 years of age, and is a public building that exists everywhere like a police station, a fire station, or a community center. As the increasing importance of daycare center with high symbolism and specificity as a place for future generations, this study suggest desirable development directions for national daycare center. This study proves the necessity of design guidelines to establish basic spatial environment and plan directions for national daycare center, and proposes guidelines for national daycare center.

First of all, we verified the necessity of design guidelines for national daycare centers. We analyzed the current systems and laws for national daycare centers and identified limitations of planning standards in the current systems. We examined design task order cases for national daycare center planning and design, and surveyed user awareness and physical environment to understand the current status of national daycare centers.

This study, then, determined the direction of the design guidelines for national daycare centers suggesting the specific design guidelines. Foreign countries' advanced cases in terms of the daycare center design guidelines such as the United States, the United Kingdom, and Japan, were studied to determine

directions of design guidelines. In addition to these basic directions of design guidelines, the final direction of the guidelines was determined and formulated by considering with the problems resulted from the current systems and laws examination. A notification by the Ministry of Health and Welfare was proposed to secure the effectiveness of design guidelines. Improvement of the relevant laws and regulations was also suggested.

Limitations of the Legal System Related to the Planning Criteria of National Daycare Centers

In order to identify limitations of existing planning standards for national daycare centers, we analyzed the objectives of daycare centers, regulations and planning standards related to national daycare centers and related plan standards focusing on the Infant Care Act. Based on the results, improvements of current national day care center plan standards were considered.

This study found that the planning standard for planning and designing the national daycare center was prepared only by “Building Standards of a Daycare Center” according to Table 1 of the Enforcement Rule of the Infant Care Act. The facility area under in the “Building Standards of a Daycare Center” has been used for 25 years since enactment of the Act in 1991. This means that the facility area does not reflect the changes in social and economic conditions over 25 years. The “Building Standards of a Daycare Center” mainly focuses on quantitative standards such as site condition and size and technical standards for structures and facilities. Guidelines for the quality of the physical and spatial environments in daycare centers were hard to find.

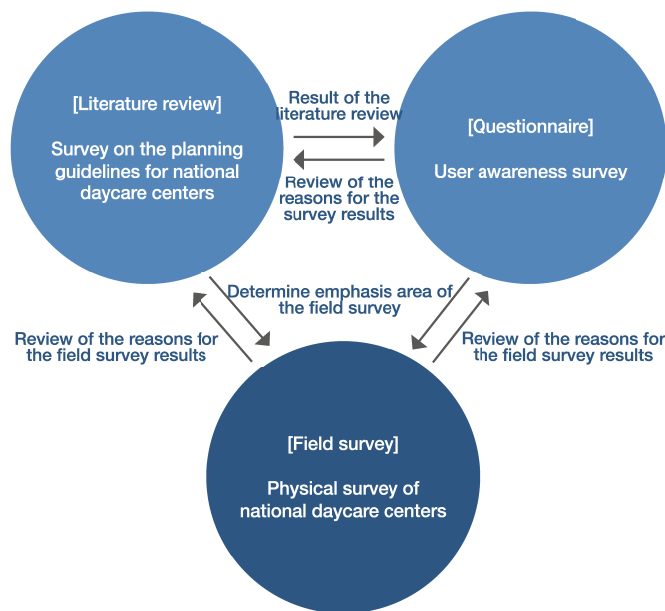
On the other hand, the “Tertiary Index for Daycare Center Assessment & Certificate” which presents detailed criteria for the child care environment, is applied to the institution only by application. This Index cannot be used as design standards because the Index is applied not to planning and designing stages but to an environment-using stage. Problems can also be found in the guidelines covered in “Building Standards of a Daycare Center.” Some requirements for the safety, comfort, and convenience of children are included in the current standards, but guidelines for the diversity and creativity of the physical activity of children are scarce. The Tertiary Index includes guidelines for physical activity and creativity, only about teaching materials and teaching instruments.

The current planning standards present guidelines for ensuring the safety of children such as safety devices by type, playgrounds and toys. The guidelines, however, are limited to present spatial planning standards such as arrangement of the daycare center, composition and planning of the main rooms. The lack of standards for sustainability in the current standards can be a problem. It is necessary to revise the guidelines to consider energy efficiency and sustainability

which are necessary for public buildings.

Analysis of National Daycare Centers

Building conditions of national daycare centers has been analyzed to examine the limits of the national daycare center regulations and the planning standards and to represent design considerations to realize the goal of the daycare process and to build a national daycare center with a high design quality. The building conditions analysis of national daycare centers was conducted in three parts: analysis of design guidelines related to the building of a national daycare center, a user perception survey, and a physical condition survey.



Main content and method for the survey

The analysis found that each local government and facility provided different guideline contents from each other. In the absence of a legal design guidelines, some local governments offer design guidelines in accordance with their own needs at public design competitions. Even through some common guideline items are found most of guideline items are different depending on the local government and facility. Some guidelines provide details for ensuring safety, comfort, and convenience that are not specified in the legal planning standards. Certain local governments provided excessive instructions specific facility uses and materials such as installation of an oxygen room or using cypress wood. Other design guidelines ask a public building's contents such as space expansion, economic efficiency and energy conservation. Common design guidelines for ensuring the consistent quality of national daycare centers

should be proposed, considering construction types of each national daycare center in separate planning guidelines.

Design guidelines and cases of national daycare centers

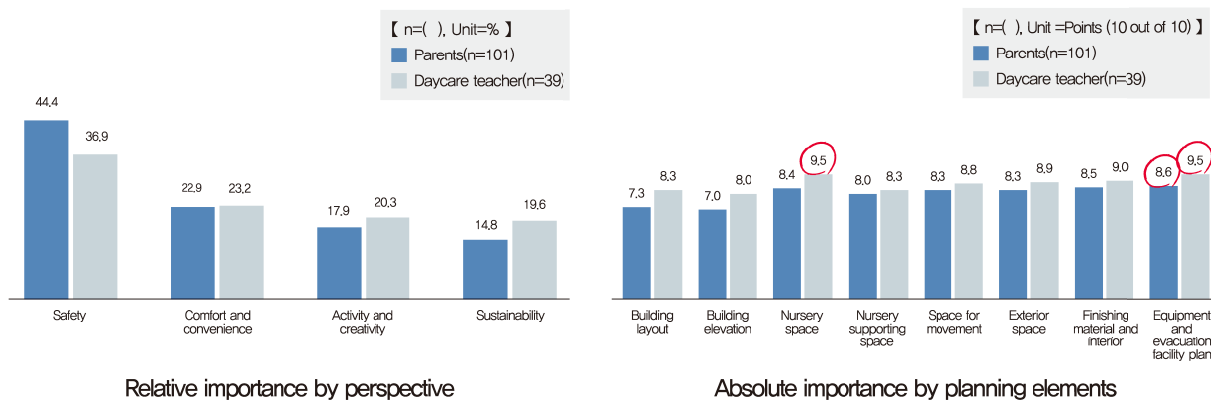
| Classification | | Design Guidelines | Observation |
|------------------------------------|------------------------------------|--|-------------|
| Related to the safety | Building layout | Place the building more than 50m away from a hazardous facility | 7 |
| | | Ensure safety by planning a separate entrance and exit route for vehicles | 10 |
| | Nursery space | Install anti-slip tiles in bathrooms and toilets | 30 |
| | | Install temperature regulators to prevent burns when using hot water in bathrooms and toilets | 12 |
| | Movement space | Install tempered glass and hand protectors in hallway and classroom doors, and use glass in the doors so that both adults and children can see through them | 17 |
| | | All doors and windows, except for emergency exits, should not be locked from the inside and should open easily from the outside | 8 |
| | Exterior space | The playground should follow children's playground safety management regulations and should have a safety test after installation. | 13 |
| | | Ensure more than 1.2m guardrail height around the rooftop playground at the daycare center building | 6 |
| | Finishing material and interior | For floors, corners, and furniture, a careful selection of materials is required and all corners should be rounded. | 23 |
| | | Considering that it is a space for infants and young children use, safe finishing materials and techniques which are not harmful to humans should be used (use eco-friendly finishing materials) | 27 |
| | | Using drivit in among finishing materials is not permitted | 9 |
| | | Use nonflammable, semi-nonflammable, or flame retardant materials | 10 |
| | Equipment and evacuation equipment | Install a separate emergency slide for each floor | 23 |
| | | Use flame resistant indoor decorations including curtains and wallpapers | 6 |
| Related to comfort and convenience | Building layout | Plan comfortable safety, traffic, and environmental layouts | 10 |
| | Building elevation | Apply bright, active, or soft colors for the elevation | 6 |
| | Nursery space | Plan the nursery room for 2.64m ² or more per infant including a living room, a crawl room, and a play room | 16 |
| | | Plan a place where children can relax as if they were at home | 12 |
| | | Place the nursery room for infants on the first floor | 22 |
| | | Install washbasins and urinals for toddlers | 24 |

| Classification | | Design Guidelines | Frequency |
|------------------------------------|-------------------------------------|--|-----------|
| Related to comfort and convenience | Nursery supporting space | Make a room for <i>minimal</i> teaching materials using a EPS/TPS space on the basement floor | 7 |
| | Space for Movement | Consider the inside and slope measurement for toddlers (a gradient of 30 degrees or less) | 7 |
| | | Plan the height of the windows, stairways, and door handles, etc. for the convenience of children | 15 |
| | | Plan the classroom door without a threshold | 13 |
| | | Plan a space that can include children with disabilities | 27 |
| | | Plan a food-exclusive elevator (dumb waiter) | 8 |
| | | Use a floor heating system in the nursery room, hallways, and stairs | 30 |
| | | Plan to ensure adequate sunshine and ventilation | 11 |
| | Equipment and evacuation facilities | Keep proper indoor temperature, humidity, and air quality (air circulator, etc.) | 6 |
| | | Install sunshine and ventilation facilities to provide a clean indoor environment in the kitchen | 12 |
| | | Install lighting to ensure safe and comfortable illumination | 6 |
| | | Install faucets to supply water to the outdoors and rooftop | 8 |
| Related to activity and creativity | Nursery space | Install internet and TVs in classrooms | 6 |
| | Exterior space | Allow 3.5m ² per infant and toddlers in the playground (except for the youngest class) | 7 |
| | | Install more than three types of outdoor play facilities such as sandy fields and large muscle activity facilities | 9 |
| Related to sustainability | Spatial Plan | Plan for changes in the composition of future personnel, plan the space larger than necessary for variability, safety, and convenience to cope with the changes and also consider an efficient and functional layout (considering the expansion) | 6 |
| | | Arrange spaces according to the connectivity and diversity of each room and for easy management | 8 |
| | | Plan spaces to maximize natural light and ventilation to save energy | 6 |
| | | For future space expansion, a partition wall should be installed in a changeable shape, or space expansion and flexibility should be taken into account. | 14 |
| | Material | Materials that are easy to handle and allow follow-up management are recommended | 8 |


A perception survey of national daycare center users was conducted with parents with children 5 years old or younger and principals and teachers of national daycare centers, with 101 parents and 39 daycare teachers responded to the survey. The survey was conducted online for parents, and child care teachers were individually surveyed through visits to daycare centers. The results of this study suggest that both parents and teachers consider the order of safety, comfort and convenience, activity, creativity and sustainability. In the case of

teachers, activity, creativity, and sustainability were perceived as important, while parents were concerned about the safety of children as a top priority. As for the planning factors, both parents and teachers evaluated “equipment and evacuation facility planning,” “child care space,” and “finishing materials and interior” as important. Parents assigned more importance to “equipment and evacuation facility planning,” while teachers assigned more to “child care space.” On the other hand, the degree of importance of the architectural exterior design such as “building layout” and “building facade” was relatively low.

As a result, parents and child care teachers that design guidelines are needed to protect children in a safe and pleasant environment, rather than focus on activity, creativity, and sustainability. We determined that more detailed guidelines on facilities, evacuation spaces, and child care spaces should be concerned than layouts and elevations of buildings.



For a physical condition survey 60 public nursery schools built within the past five years were asked to allow site visits. Seven public daycare centers were visited since they agreed to the request. As a result, the considerations for improvements in the physical environment of national daycare centers are summarized in terms of safety, comfort and convenience, activity, creativity, and sustainability.

| Classification | Examples | |
|-------------------------|--|--|
| Safety |  <p>Install a fence on the road side</p> |  <p>Use safe flooring material for the play area</p> |
| Comfort and convenience |  <p>Obtain enough natural light</p> |  <p>Connect a nursery room to a toilet</p> |
| Activity and creativity |  <p>Various space composition and utilization for creativity improvement</p> |  <p>Consider the connection of inner and outer spaces to feel the change of the natural environment</p> |
| Sustainability |  <p>Changeable space composition</p> |  <p>Furniture design considering eco-friendly and durability</p> |

Survey and Analysis of Related Standards of Overseas Daycare Centers

As a preliminary work to formulate the plan items in the design guidelines for national daycare centers, we focused on cases in the UK, US, and Japan where design guidelines and related standards applied to daycare facilities. The regulations applicable to daycare facilities differ from country to country and the age categories of the children provided are different. Even though the political foundation for child care is not same, the related laws and standards that affect the operation of the design guidelines can be analyzed a comparable framework. Standards of each country for this purpose are as follows.

- (US case) GSA's "Federal Childcare Center Design Guide"
- (UK case) "School Basic Law", "School Facilities Standards", "Infant School Design Standards"
- (Japan case) "Child Welfare Law", "Standards on the Facilities and Operation of Child Welfare Facilities", "Guidelines on Standards for the Establishment of Daycare Centers"

Even though the detailed elements and the hierarchy are different, this study found that the guidelines are divided into and very specific standards in order to consider the needs of adults and children, and that detailed safety standards focusing on infants are being faithfully presented. Findings of the analysis suggest directions of the development of national daycare design guidelines in Korea. In other words, the design guidelines for overseas include educational considerations, non-physical standards such as the value that the child care facility should aim for, the basic direction of the designs and the role of the related personnel. It also provides detailed instructions on indoor spaces such as multipurpose spaces, offices and resting areas, and outdoor spaces such as parking lots and landscaping.

Establishment of standards example for overseas daycare centers

| Classification | | | | U.S. (GSA's Federal Childcare Center Design Guide) | U.K (Infant School Design Standards) | Japan (Guidelines on Standards for the Establishment of Daycare Centers) |
|--------------------------|--|--|---|--|--|--|
| Non-physical standard | 1) Vision and plan | User of daycare center | Adult | | | |
| | | | Child | | | |
| | | Process steps of planning (design and implementation) | | | | |
| | 2) Management system | Related standards | | | | |
| | | Subject of daycare center management | | | | |
| | | Daycare center cost policy | | | | |
| | | Daycare center quota | | | | |
| | | Daycare center opening time and nursing time | | | | |
| Physical standard | 3) Purpose of planning of daycare center | | | | | |
| | 4) Architecture plan | Arrangement plan | | | | |
| | | Layout plan | | | | |
| | | Elevation and sectional plan | | | | |
| | 5) Indoor space plan | Nursery room | Infant (0~12months) | | | |
| | | | Toddler (12~36months) | | | |
| | | | Young child (more than 36 months) | | | |
| | | Bathroom | | | | |
| | | Feeding room | | | | |
| | | Entrance | | | | |
| | | Reception | | | | |
| | | Office | | | | |
| | | Meeting room | | | | |
| | | Rest room | | | | |
| | | Multifunctional space (lounge, etc.) | | | | |
| | | Toilet | For adult (staff) | | | |
| | | | For child | | | |
| | | Dispensary room | | | | |
| | | Kitchen / Dining room | | | | |
| | | Food storage | | | | |
| | | Sewage room | | | | |
| | | Storage | | | | |
| | | Laundry room | | | | |
| | | | Play ground | Indoor | | |
| | | Outdoor | | | | |

| Classification | | | | U.S. (GSA's “Federal Childcare Center Design Guide) | U.K (Infant School Design Standards) | Japan (Guidelines on Standards for the Establishment of Daycare Centers) |
|-------------------------|---|-------------------|--------------------------|--|--|--|
| Physical standard | 6) Exterior space and equipment plan | Exterior space | Parking lot | | | |
| | | | Outdoor facility | | | |
| | | | Landscape | | | |
| | | | Outdoor equipment | | | |
| | | equipment plan | Noise / sound | | | |
| | | | Lighting | | | |
| | | | Heating | | | |
| | | | Drinking water supply | | | |
| | | Interior | Window | | | |
| | Storage | | | | | |
| 7) Fire and safety plan | | | | | | |
| 8) Sample design plan | | | | | | |

The Enforcement Rule of the Infant Care Act of Korea presents the form of minimum standards with non-physical standards such as targets, operators, gardens and so on, and regulations on physical space elements such as arrangement plans, indoor and outdoor spatial plans, and facilities. Therefore, the daycare center design guidelines need to provide more detailed directions to ensure the quality of space and a flexible plan to build a safe child care environment suitable for infant education, beyond the minimum planning standards.

Proposing Design Guidelines for National Daycare Centers

Design guidelines for national daycare centers is proposed on the basis of the analysis of limitations and problems on the national daycare center planning standards, the analysis of daycare centers, and the investigation and analysis of the standards related to overseas daycare centers. Specifically, a pool of planning items was prepared to constitute the guidelines, the propriety and necessity of these plan items were examined, and the final design guidelines were presented.

Based on the basic plan items presented in the current Enforcement Rule of the Infant Care Act, planning items were reviewed with cases of designing public daycare centers for the last five years and overseas cases such as USGSA's "Federal Childcare Center Design Guide," the UK's "Infant School Design Standards," and Japan's "Standards on the Facilities and Operation of Child Welfare Facilities." As a result, a total of 344 (211 domestic, 133 overseas) planning

items were derived.

The propriety and necessity of planning items were surveyed. In order to ensure the convenience of the survey, only 144 items, which are frequently cited among 344 plan items, were processed. For the propriety survey, 79 plan items, which were commonly cited in the domestic design public subscription guidelines and overseas' cases, were set as mandatory items, and the degree of propriety was measured on a 5-point scale. The necessity survey had 67 plan items missing from the propriety survey as a recommendation item, so that multiple choices can be made without limiting the number of responses in order to understand the urgency of domestic introduction. Questionnaires were sent to experts and public officials who were directly or indirectly involved in the planning and managing of daycare centers. The number of subjects was 68 and the analysis was conducted on 46 (67%) excluding the non-responders and the invalid answers. In addition to the questionnaires, a comprehensive roundtable discussion was held to establish the development direction of the design guidelines. As a result, we found specific directions about the composition of the indicators, objects, and content and quantitative standards for each planning item.

In order to establish a spatial standard that takes into account the stage of development of the child and its characteristics, the characteristics of developmental stages and the data for infants' body sizes were considered together. The minimum standards of infant care facilities in OECD countries were also analyzed to suggest improvements of the quantitative standards of Korean daycare center building standards.

In order to secure the effectiveness of the design guidelines, a proposal to designate the design guidelines for the national daycare center as a notification of the Ministry of Health and Welfare is suggested as a policy proposal.

Key word : Enforcement Rule of the Infant Care Act, National Daycare Centers, Design Guideline, Standards

