

A Study on the Daycare Center Architectural Planning Based on the Concept of the Metonymy-K-Dong Daycare Center

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Abstract: The purpose of this study is to investigate the concept of the architectural planning with an extended meaning considering the forms and the functions of the architectural space not from the process of the morphogenesis based on similarity or the process of the morphogenesis represented by the images. Therefore, it is aimed to propose the architectural planning proposal applying not the notion of the metaphor based on similarity but the concept of the metonymy. For this purpose, this study compared the concept of the metonymy and the metaphor and based on the possibility of the concept of metonymy, suggested an alternative architectural design plan. The concept of the metonymy applied to this study is as follows. First, the concept of the metonymy that can be applied to the architectural space planning is a comprehensive concept that can be applied to the relationship between non-material and material elements such as the forms and the functions. Second, the architectural space to which the concept of the metonymy is applied is not a fixed space that accepts a given program but a user-oriented space that is considered as a complex structure of the forms, functions and programs. Third, through the process of the metonymy based on the psychological perception process, space with different physical conditions can be used integrally and it is possible to have the flexibility of the forms and the functions.

Key words: Metonymy, metaphors, daycare center, architectural planning elements, architectural space, flexibility

INTRODUCTION

The architecture is a physical reality with a form based on its function. The concept of the planning that realizes the image of the building in physical reality which is composed of the visual images in the architectural design is one of the most important factors. But it is not only a visual image that reveals the essence of the architecture. The nature of the architecture and the function of the building are realized by the synthesis of elements of different characteristics such as forms and functions.

The value judgment on the architectural space is based on the personal experience. Especially, the experience of the architectural space in childhood has a great influence on the value judgment of the architectural space. In this regard, the value of the architectural space experiences in childhood is above all an important factor. A daycare center is a place where infants and young children first establish social relations. Therefore, in terms of development, the spatial environment of the daycare center should be planned, so as to have a positive psychological and emotional impact on the child. As the nature of the architectural space is made up of the

combination of the forms and the functions of the space not only the quantitative improvement such as size and facility contents but also the interest of environment in space itself is one of the most important planning factors. There are various ways in which the children perceive their surroundings according to the stage of the development. Thus, the planning of the space for infants and young children should be taken away from the concept of the space with fixed and predictable symbolic forms, so that, various experiences and the active participation of infants and young children can be taken into consideration.

The purpose of this study is to investigate the concept of the architectural planning with an extended meaning considering the forms and the functions of the architectural space from the process of the morphogenesis based on similarity or the process of the morphogenesis represented by the images. Therefore, this study purposes an architectural design proposal for the daycare center based on the concept of the metonymy which can be replaced with a new object not the concept of the metaphor based on the similarity used in planning the architectural space.

MATERIALS AND METHODS

Contents of the study: The contents and the process of this study are as follows. First, this study compares the concepts of the metonymy and the metaphor. Second, the method of the spatial composition and the method of the effective environmental improvement are summarized for the architectural environment of the daycare center. Third, this study finds the possibility that the concept of the metonymy can be applied to the architectural space planning and substitutes it with the architectural planning elements of the daycare center based on the relationship between the forms and the functions of the space and the relationship between the interior space and the exterior space. Finally, this study proposes the architectural design proposal based on the concept of the metonymy according to the relationship between the forms of the architectural spaces and programs.

Metonymy: The meaning of the metonymy means to use another word that reminds of it instead of a word. The metaphor is the most commonly compared concept with the metonymy. The difference between these two concepts is that while the metaphor is transposed to another object in which the object has a relation of analogy and the metonymy substitutes the object with another object related to it (Lee and Lee, 2003). In terms of linguistics, the concept of the metonymy and the metaphor has similarity in three aspects. First, the metaphor and the metaphor are not just rhetorical expressions but they structuralize human thought, cognition and behavior. Second, they are based on the human physical and cultural experience. Third, they are concepts that have the systematic nature not the arbitrary (Kim, 2016). Despite these similarities, the metonymy differs from the metaphors. Contrary to the metaphor of thinking about one thing in relation to another, the metonymy is a concept representing another reality by the reality. The difference between these two concepts is evident in the difference of each comparison area (Kim, 2016).

The metonymy and the metaphor are also different in human perception. Contrary to the metaphor in which the meaning is interpreted and transmitted through the process of the conceptualization based on the rational judgment based on the similarity to the given object, the metonymy is conveyed as perception as intuition by the senses by excluding the intervention of mind or reason (Park and Choi, 2016a-c).

The basic attribute of the metonymy is to replace one object with another that is related to it. This substitution

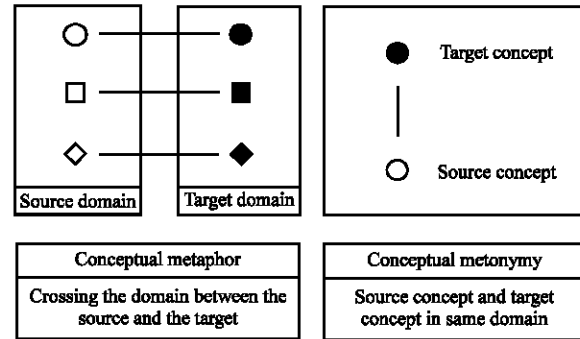


Fig. 1: Distinction between the metaphor and the metonymy according to domain and concept (Kim, 2016)

between objects is generally based on material relations (Cho and Lee, 2004). Although, the concept of the metonymy is a concept that can be applied to objects that are closely related to each other, the relationship cannot be applied only between physical objects. The concept of the metonymy is a comprehensive concept which could also be applied to relationships between the non-physical and the physical elements such as forms and functions. This can be found in the case of the conceptual applications in architectural planning such as ‘representation metonymic placeness in the architecture’ (Cho and Lee, 2004) (Fig. 1).

Daycare center: Developmentally, infants <6 years of age have a critical period of development. The positive stimulations for the development of the infants have a great influence on the attachment formations and the brain developments between the infants and adults. In particular, the first 3 years of life are an important period in which growth and learning begin. Studies have shown that the infants raised with careful cares in a stable and predictable environment have more positive developments than the infants raised in otherwise unfavorable environments (Choi, 2013). Thus, the architectural space of the daycare center should have a precondition that the development of the child should be considered and a comprehensive consideration of the forms and the functions of the architectural space which can develop a healthy body and spirit. One of the most important factors to consider in planning the daycare center is that it should be planned to fit the life of infants and toddlers. The basic environmental factors that daycare center should have are an environment that can move freely, a comfortable environment that is psychologically comfortable, an environment that allows people to do themselves and an environment that can control oneself (Son, 2013).

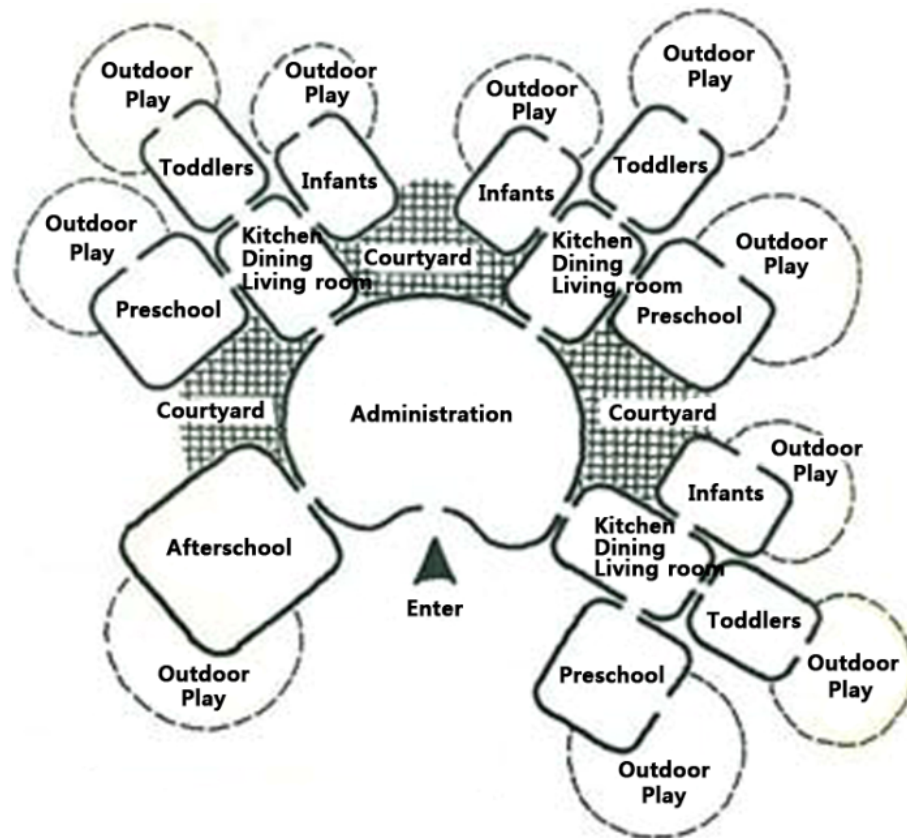


Fig. 2: Residential space oriented daycare center model (Kim, 2013)

Spatial characteristics of the daycare center: Generally, it is the place related to the architecture that is the most apparent place of the major memories in childhood (Kim and Lee, 2001). In particular, pre 7 years old infants have the decisive time of development and providing a favorable architectural environment for the development at this time has a positive effect on the growth and learning of the child (Son, 2013). According to the infant child care program provided by the Ministry of Health Welfare and Family Affairs, the childcare environments are divided into the daily living space and the space for learning through play (Park and Choi, 2016a-c). Especially for children, a play is an extension of learning, so that, internal and external growth can be achieved through relationships with objects and others. It is desirable to plan a space for the learning through play which is divided into various programs. However, considering the insufficient space due to various practical reasons, it is necessary to consider planning a space that can integrate play and education programs (Park and Choi, 2016a-c). In addition to having a specific program such as a nursery room, securing the enough service space to support is also a necessary planning factor for effective learning. However, this is also the reality that it is neglected

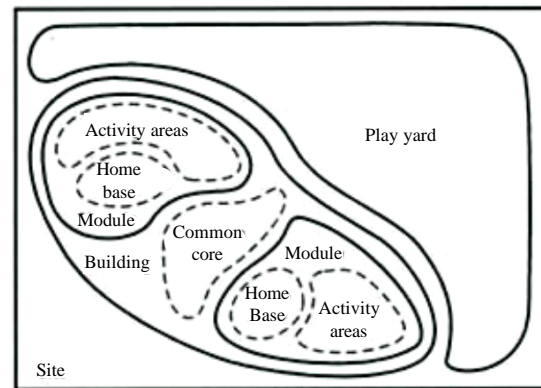


Fig. 3: Public space oriented daycare center model (Kim, 2013)

because of the lack the of space. Thus, it is necessary to consider the realistic planning factors and planning methods applicable to effective education even if there is not enough space (Fig. 2 and 3).

The spatial composition model of childcare facilities such as daycare centers can be divided into residential space oriented models and public space oriented models. The residential space oriented model focused on the

Table 1: Characteristics of the daycare center space composition (Jang and Shin, 2010)

Indoor space (Jang and Shin, 2010)	Outdoor space
Integration of play and learning	Extension of indoor activities
Connection between language and art education and play	Strengthening the relationship with nature
Space to induce static play	Development of various senses
Variable space	Informal education to stimulate imagination
Space associated with indoor furniture such as cabinet and partition	
Place to sit on a chair or on the floor	

Safe and protected space; A linked space having a cyclic structure; Space of various forms and functions

space that serves as a living room, a dining room and a kitchen where children, teachers and parents can join together. The public space oriented model shares the play room, office and kitchen for physical activity and this space can be connected to outdoor activity space (Kim, 2013). The common spatial planning characteristics of these two models show that although, the functions of the spaces in the two models are different, the role of the space has the characteristics of integrating the activities of infants and toddlers. This means that it is a major planning factor to plan the space that can be used for multipurpose by integrating the related functions in the space planning of childcare facilities such as daycare centers. Thus, it is an effective planning method that can give a positive stimulus suitable for the development of infants and young children by integrating the functions related to each other and planning the necessary space and thereby inducing the free activities of infants and toddlers.

Play behaviors of infants are influenced by various factors. Especially, the space planning with the flexibility to promote play behaviors of infants should be actively considered in terms of providing a physical environment in which infants can experience various play behaviors (Nam and Kim, 2014). The children's play environments must be safe, changeable and finite structures of the circulation. There should also be a change in size and form such as a small place, a large place, a high place and a narrow place (Byun and Choi, 2006).

The children's play space is divided into indoor play space and outdoor play space. The outdoor play space is a play space that should be actively promoted from the viewpoint of education such as the relationship with the nature and the development of various senses through it. The outdoor play space is a place where formal and informal education can be achieved by stimulating the imagination of the children (Byun and Choi, 2006). In the outdoor play space, the related facilities are functionally connected and the movement between the respective areas should be smooth and the indoor activities should be able to be extended and integrated into the outdoor play space. The outdoor play space is a place where free physical activities can be done away from the limited space and it is a place where children can make various

social relations between infants at the same age. The outdoor play space is a place where many cooperative activities are performed and it is a place where various and rich sensual experiences can be obtained through interaction with nature (Moon, 2003). Table 1 summarizes the spatial characteristics of the daycare center and the necessary architectural planning elements for the improvement of the environments of the daycare center and the creative utilization of the indoor/outdoor space discussed.

RESULTS AND DISCUSSION

Design concepts: The metaphorical planning concept used in planning the shape of a building or the architectural space is made through the process of creating the shape of a building based on similarity. However, the process of creating the shape of a building based on this morphological similarity is no longer new and this is a result of the architectural planning as a means of a simple morphology rather than as a result of the consideration of the architectural space itself. In order to escape from 'familiarization' by habitual relations such as planning the airport like a bird and expressing the building adjacent to the sea in the form of waves, a new attempt of 'making strangeness' appears as one of the practical planning methods (Lee and Lee, 2003). The 'making strangeness' is a technique for revealing and reactivating the concealed meaning in a uniform and fixed order and appears as a way to cut off the context of the existing relationship (Cho and Lee, 2004). However, this kind of 'making strangeness' results in the fact that there is no chance of communicating each other by emphasizing only the difference between the subject and the object. Thus, for the conceptual completion of the architectural space which can be described as the essence of the architecture, it is necessary to have a method of planning that can express and reveal new relationships based on the conceptual interrelationships between the subjects and the objects, rather than simple 'making strangeness' techniques. In this sense, the concept of the metonymy has the potential to be applied to architectural planning.

Unlike figurative, metaphorical or similar forms commonly found in the existing architectural forms, the

metonymy does not simply refer to visual planning elements. Also, since, the form of the architecture is often composed of the sum of the images of various elements rather than being expressed as one image, it is desirable to apply the concept of the metonymy which has comprehensive meanings rather than transforming the visual representation of various elements into metaphorical images one by one. The concept of the metaphor has an advantage that the visual representation of the image of the comparison object can be clearly revealed. However, as a result, the characteristics of the space can be defined only by the visual image rather than the fundamental concept of the architectural space which limits the expression of the concept of the architectural space that can be used in various ways. The concept of the metonymy is not only a visual expression but also a relation that can be applied to the relationship between elements of different characteristics such as forms and functions, so, it has the advantage of expressing and revealing the abundant concepts of the architectural space by combining various factors. In other words, applying the concept of the metonymy which is determined by the comprehensive relationship of forms and functions is an effective planning method for the realization and representation of the essential concept of the architectural space. In addition, applying the concept of the metonymy is meaningful in the sense that the architecture is not merely a result of a formal image but a comprehensive result that is completed by the interaction of the human activities and the space.

Applying the concept of the metonymy: Because the concept of the metaphor is made through the process of the morphogenesis based on similarity when planning the daycare center by applying the concept of the metaphor, it tends to be planned by using the simple forms such as circle, square, triangle, etc. This is not limited to the forms of the building but also the color of the building, so, it is easy to find a daycare center with colors close to the primary color. This is an example of the metaphorical architecture based on the morphological similarity.

In contrast, since, the concept of the metonymy is a comprehensive concept that can be applied to the relationship between the non-material and the material elements such as forms and functions, the concept of the metonymy has a potential to show a familiar and unfamiliar environment in a new and unexpected way. Therefore, unlike metaphor or simile, the application of the concept of the metonymy becomes a planning method that can comprehensively explain the relationship between the forms and the functions of the elements that make up the architectural space.

In general, a space with a program is used for a specific purpose and the program serves as a criterion for discriminating the space of each user and a means of selecting a space as needed and also defines the relationship between the spaces. However, since, the purpose of this study is not to create a fixed space to accommodate a given program but to implement the concept of the essential space based on the comprehensive relation of the forms and the functions of the space, this study proposes a space with uncertainty considering the complexity.

The relationship between indoor and outdoor spaces is an important planning factor in that it is important to plan a space where children can move freely and have diverse experiences in a daycare center. Especially, indoor and outdoor play spaces need a close relationship with each other in order to construct the creative play environments of a variously changing circulation system. The outdoor play space of the daycare center is a place where children can experience freedom more than indoor play space and play with complex and creative activities. In addition, outdoor play spaces can be used flexibly according to the various play activities, so that, children can actively interact with their peers and participate in various activities.

The outdoor play space should be functionally linked to the associated facilities be able to move smoothly between play areas and be able to extend and integrate indoor activities. Therefore, it should be planned to integrate the access to the outdoor space and the inner circulations of the building. This study proposes a flexible space with the concept of the metonymy to facilitate the play behavior of infants and young children by planning a play environment that can utilize indoor space and outdoor space creatively and a changeable circulation structure. Especially, for the close relation with the building, it is considered that the roof of the building is used as an outdoor play space.

Architectural planning elements of the daycare center based on the concept of the metonymy: This study applies the concept of the metonymy as an extended meaning beyond the process of the morphogenesis based on similarity to the architectural plan. In other words, this study proposes the architectural planning proposal based on the concept of the metonymy considering the relation between the forms and the functions of the architectural space. For this purpose, the architectural planning elements based on the relationship between the forms and the functions of the architectural space and the relationship between the indoor space and the outdoor space are specified, Table 2 summarizes the architectural

Table 2: Architectural planning elements of the concept of the metonymy for the daycare center

Indoor space	Outdoor space
Integration of the play space and the learning space	Continuity with the indoor play space
Continuous functions	Variety of programs and activities
Space with visual and spatial connection	Space inducing outdoor physical activity
Space inducing indoor physical activity	Space to develop various human senses
Space to develop creative imagination	
Connection to outdoor space	



Fig. 4: Proposed site

planning elements applicable to the architectural planning proposal of this study based on the characteristics of the daycare center space program.

Proposed site: The proposed site of this study is located in a quiet residential area surrounded by multi-family houses of 3~4 floors. Two roads cross the Southeastern side of the site and it is possible to enter the site from here (Fig. 4).

Site plan: In the South-Eastern corner of the site, children's nursery rooms were planned and a parking lot and sub-entrance were planned to the north of the site. The service facilities are planned to be located in the Northwestern part of the site, so that, children can be separated from the service circulation and the symbolic identity of the building from the main street can be obtained by the form of the nursery room mass.

In order to strengthen the activities in the outside space which is one of the main activities of the children, exit door to the outside from each floor was planned. This is to allow the indoor nursery room and the outdoor playground of each floor to lead to a continuous space. In addition, the outdoor play space of each floor is connected by a separate vertical circulation, so that, the spatial connection of the external space can be made natural and organic. This is to allow children to experience the various outdoor activities. In order to secure outdoor play space, the rooftop of the building was planned as a play space for children. In order to overcome the closed

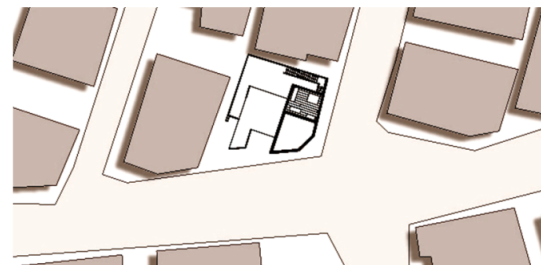


Fig. 5: Site plan



Fig. 6: View from the main street

and dull environment of the rooftop, a nature-friendly playground was planned using nature-friendly materials (Fig. 5 and 6).

Floor plans: The center of the childcare space is a multipurpose space that integrates the second and third



Fig. 7: Floor plans; a) 1st floor plan; b) 2nd floor plan; c) 3rd floor plan and d) 4th floor plan

floors. This vertically continuous space enriches the relationship between the interior spaces visually and spatially by making functional connections between the rooms and visual connections between the floors. It is also intended to protect the safety of the children by ensuring that daycare teachers always observe children (Fig. 7).

In addition to the direct stairway connecting each floor, a separate functional circulation was planned to start from the first-floor nursery room to the fourth-floor nursery room. This is to allow the children to feel one space vertically continuous rather than a separate space by each floor. The two-story multi-purpose space at the second and third floors is a place where children can play various activities. This space is composed of the special architectural planning devices such as low-level walls, alcove space and different level of floor space, so that, it can be used as indoor play space for children. Also, this space can be used exclusively as a multipurpose space for play, performance, video presentation as needed (Fig. 8).

The daycare center is an entire playground. In other words, the daycare center should be a space where children can feel the building as one big playground while running around the whole building rather than being trapped in the compartment of the building. For this purpose, the indoor space, the outdoor space in this building are closely connected to each other, so that, they can establish an organic relationship with each other.

The circulation system of this building was used not simply to connect the spaces between the rooms with each program but to comprehensively cover the



Fig. 8: Circulation network of the daycare center



Fig. 9: Multi-purpose room

boundaries of space. The circulation system of this building itself is a play space that stimulates children's imagination and at the same time an architectural element that defines the relationship between different spaces. The architectural design proposal as a daycare center of this study is a space of the metonymy as a new meaning combined with the forms and the functions (Fig. 9).

Sections: The walls of the nursery room at the third and fourth floors were designed as a bookcase, closet and partition wall that fit the module of the window, so that, the possibility of space utilization can be increased. The nursery room was planned to have different level height floors and a sloping ceiling, so that, it could satisfy both the formative beauty and the spatial richness at the same time (Park, 2016).



Fig. 10: Nursery room section

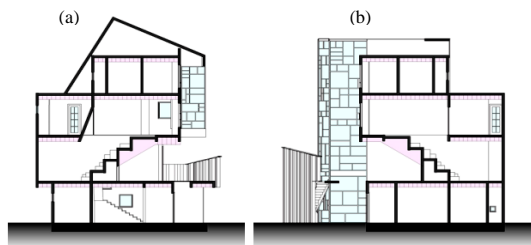


Fig. 11: a, b) Multi-purpose room section

The windows of various sizes and harmonious positions planned on the wall enriched the relationship with the visually connected outer space. This is to make a creative space that stimulates children's imagination by enlivening the mood of the nursery room which might be monotonous (Fig. 10 and 11).

Elevations: The exterior walls of the South and the East nursery rooms were planned with timber finishings which could express the warmth of the natural materials. To ensure the unity of the materials and to protect the children in the first floor and the deck play space on the second floor, a wooden louver was planned along the site boundary to create a safe and comfortable outdoor space. The 3rd and 4th floors could be exposed to separate masses, ensuring the visual differentiations from the front streets. In the geometric staircase and the windows on the South side of the nursery and the square windows on the Eastern wall, color coordination was applied to secure the identity as a daycare center. This is to enable children to develop their visual cognitive ability and the sense of the color abundantly (Fig. 12-14).

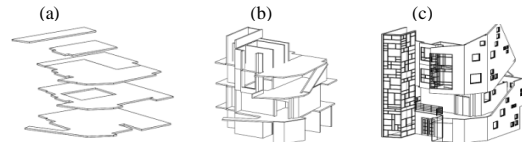


Fig. 12: a-c) Architectural design components of the building slabs, structure, skin

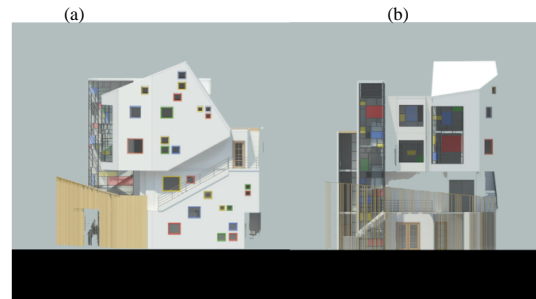


Fig. 13: a, b) Elevations



Fig. 14: Bird's-eye view from the main street

The purpose of this study is to investigate the concept of an expanded meaning of the architectural planning considering the forms and the functions of the architectural space from the process of the morphogenesis based on similarity or the process of the morphogenesis represented by the images.

By applying the concept of the metonymy to the architectural design process, the proposal of this study overcomes the limitation of making the forms of the building which was recognized only as a visual image and finds out the hidden relationship that the forms, the functions and other various planning elements of the building are set as a comprehensive relationship. This study has significance in that it showed the possibility of forming a new concept of the architectural space by the design process based on the concept of the metonymy.

CONCLUSION

This study proposed an architectural design proposal applying the concept of the metonymy which means to replace with new objects, not the metaphor based on the similarity that is used when planning the shape of a building. In this study, the concept of the metonymy and the metaphor were compared and the concept of the metonymy was replaced with the architectural planning elements which can be applied to architectural space planning. Based on the relationship between the forms and the functions and the relationship between the interior space and the exterior space, this study proposed a daycare center plan as an architectural design proposal based on the concept of the metonymy.

The concepts of the architectural planning based on the concept of the metonymy which discussed in this study are summarized as follows. First, unlike the concept of the metaphor, the concept of the metonymy is a comprehensive concept that can be applied to the architectural space planning because of that it is not only applied to the relationship between the things and the objects but also it can be applied to the relationship between the non-material and the material elements such as forms and functions. Second, the architectural space based on the concept of the metonymy is not a fixed space that accepts only a given program but a user-oriented space that is considered as a complex of forms, functions and structures. Third, through the application of the concept of the metonymy based on the psychological perception process, it is possible to integrate the space with different physical conditions and to have the metonymical flexibility of forms and functions.

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