



Smart Park Design as a Supporting Facility for Child Growth

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Abstract

The goal of Smart Park Design is to provide a place for children to develop their talents/artistic creation, learning technology, gain skills, read knowledge books, and recreation areas. This study uses the descriptive analysis method from the obtained data, both primary data and secondary data. This work will formulate the basic program for the development of the Smart Park in the sports center area of the North Lombok Regency. The Smart Park design is divided into 4th zones: parking zones, transition zones, building zones and facilities, and green open cast zones. The design of the Smart Park will help children's mental and social development well and make children healthier and happier. Children as the nation's successor will become a reliable driver to develop towards a developed and prosperous Indonesia.

Disciplinary: Architectural Design, Child-Oriented Facility, Child Development, Child Law & Regulations.

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1 Introduction

The open garden area is one aspect where there are many equal facilities available. Various types of facility users are founding in the area, from early childhood to senior citizens. One example of an open park is the Child-Friendly Integrated Public Space (CFIPS), which is currently developing. The CFIPS develops in a residential area, where the benefits can be felt directly by the residents. It also serves to fulfill the rights of children to be able to live, grow, develop, and achieve optimally.

Smart Park is a place to get education/knowledge, talent/art/skills development, library, information technology introduction, and a playground, recreation area, a place to introduce and adapt to the environment. The idea of a smart park by the North Lombok Regency BAPPEDA in coordination with the Office of Education, Culture, Youth and Sports is an effort to fulfill the facilities for child-friendly creative and recreational activities. There are many benefits when inviting children to play and seek insight in the park, especially in parks with a variety of adequate facilities, such as improving mental and social development and making children healthier and happier (Scott, 2010).

2 Literature Review

The development of the nation's character is determined through formal education and requires other facilities that support human physical and psychological development. Public facilities that can accommodate these developments include public spaces in Green Open Space (GOS). GOS as a public facility will affect the community's quality of life, physical and psychological well-being (Abbasi et al., 2016). One of the benefits of parks as GOS is to improve physical and mental health (Sarhan et al., 2016).

In the North Lombok District of Indonesia, the presence of GOS will be relevant to the commitment of the stakeholders to make North Lombok a Child-Friendly Regency. It is in line with global issues, namely the need to initiate Child-Friendly Cities (CFC). 90% of children live in underdeveloped parts of the world (Chan et al., 2016), so the CFC movement is expected to reduce this gap. The North Lombok Regency Government has plans to build facilities that support efforts to succeed in the CFC program. The Convention on Children's Rights and CFC Frameworks should not only occur through a single project but equally require comprehensive institutional and behavioral reform (Chan et al., 2016).

The combination of green space and CFC concepts was realized through the development of a Child-Friendly Integrated Public Space (CFIPS). CFIPS is an alternative facility developing in residential areas whose benefits can be received directly by residents. The fulfillment of social functions and the psychological needs of citizens with urban resources is the key to sustainable cities (Chiesura, 2004). CFIPS in North Lombok will build with the concept of a Smart Park. Carrying the smart theme, it has challenges in physical design, zoning, and circulation to its facilities.

A successful city park will positively impact visitors (Razak et al., 2016) and provide the city with a balance of space and create a buffer zone between various city functions (Turan et al., 2016). Therefore, the design of the Smart Park is equipped with multiple facilities and buildings that accommodate all ages. Even though children are the main focus, smart Park must reach young people and adults. Youth participation benefits the community by raising awareness of problems, overcoming adolescent problems, and increasing livability for all (Frank, 2006). Therefore, open spaces must be flexible and serve various activities and be attractive to all groups of visitors and residents (Heng and Chan, 2000).

The utilization of open spaces of cities globally is significantly different because of local contexts, such as local culture, social values, and climate (Karuppanan and Sivam in Xue et al., 2017). The design of the Smart Park area will adopt local wisdom values in North Lombok. From the aspect of architecture, buildings and area details will also apply the existing traditional architectural concepts. Another thing that is very important in designing a smart Park is the concept of education. An approach to early childhood education is built on goal orientation related to children's play-learning, challenging educators to simultaneously produce children and objects of learning (Samuelsson and Carlsson, 2008). Parents and guardians of children who will visit this facility must also be involved in activities at the Smart Park. Adult participation in children's play is an important part of learning activities because adult intervention can advance children's performance (Hakkarainen et al., 2013). For this reason, it is necessary to prepare regional supporting facilities to assist the process of playing while learning, which will be part of the attractions and experiences experienced by visitors.

3 Method

In the design of the North Lombok Smart Park area, the methodology is based on community aspirations. Based on the information from relevant service offices in North Lombok Regency, the proposals and ideas from related agencies will be very useful for the design process, starting from the concept and analysis until the design transformation, eventually leading to the North Lombok approval smart garden design.

4 Result and Discussion

4.1 Grand Concept Smart Park

The grand concept of Smart Park is to educate children and provide the rights of children who the State has protected. This spirit is in line with the fulfillment of children's rights as stated in the 1945 Constitution, Article 28 B paragraph 2: "Every child has the right to survival, growth, and development and is entitled to protection from violence and discrimination." Furthermore, the mandate of the Constitution is reinforced by Law Number 23 of 2002 article 4 concerning Protection of Children: "Children have the right to be able to live to grow, develop, and participate appropriately according to human dignity and dignity, and to get protection from violence and discrimination."

Smart Park is one of the facilities that can spur the application of constitutional mandates as outlined above. In addition, many benefits can be obtained from developing parks as children's facilities. Some of the benefits are:

1. They are enhancing Mental and Social Development. Open space, fresh air, and physical activity are important elements for children's brain development. All elements can be obtained by playing in the park.
2. They are overcoming stress. Children can experience anxiety or stress. One way to help him deal with stress is to get him to play in an open space like a park.
3. Make Children Happier

As a facility dedicated to children, the next concept that must be embedded includes developing an environmentally friendly Smart Park area and applying technology by the spirit of industry 4.0 launched by the Government. The Smart Park area development location is also an aspect that must be considered in development. In 2018 North Lombok Regency experienced a very severe earthquake. As a result of the earthquake, many public facilities and social facilities were heavily damaged and even destroyed. Therefore, the earthquake resistance factor is also one of the main concepts of the North Lombok Smart Park. Grand Concept Smart Park can be summarized as follows:

- • Child-Friendly Areas
- • Sustainable environment
- • Educative Facilities
- • Regional Security
- • Parenting
- • Comfortable Open Space
- • Earthquake Resistant Buildings
- • Application of Technology

4.2 Zonation Concept of Area

Zoning is an important part of regional planning. In Smart Park North Lombok, the concept of zoning distribution is based on visitor activity patterns. Visitors who have just entered the area will be in the entrance and parking zone. After this zone, visitors will enter the main zone in regional buildings and facilities, bypassing the transition zone. The function of this transition zone is so that visitors feel the sensations and experiences on the way to the main zone, which is cover by playgrounds in the form of open space. Figure 2 shows the zoning concept of the area.

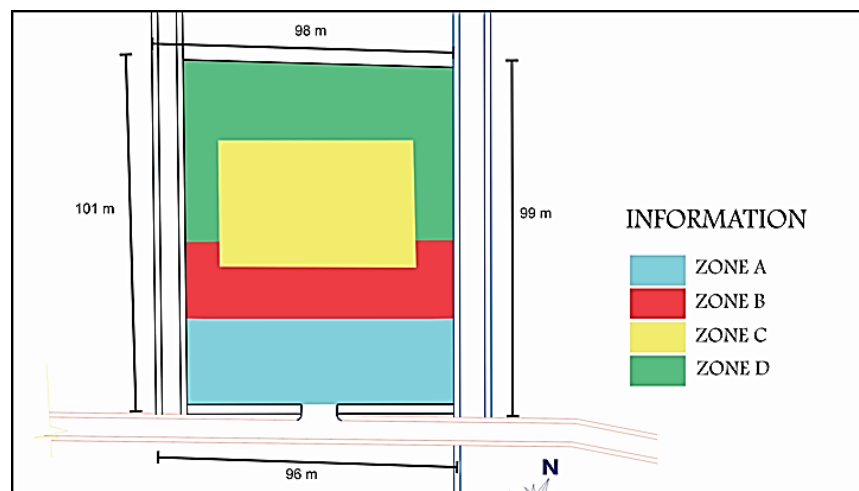


Figure 2: Zonation Concept of Area

The North Lombok Smart Park area (Figure 4) is divided into 4th zones, namely:

1. Zone A is a vehicle entrance and parking zone
2. Zone B, the transition zone
3. Zone C is the main part of the area in the form of a building zone and facilities
4. Zone D, which is an open space zone

Based on the zoning concept above, an approach is to analyze building structures that are possible in the existing Smart Park area. This building layout becomes a reference to developing the area with a direct development system and a phased development system. The layout of this

building is mass placement guidelines and regional facilities. Figure 3 describes the building layout concept in the Smart Park Area.

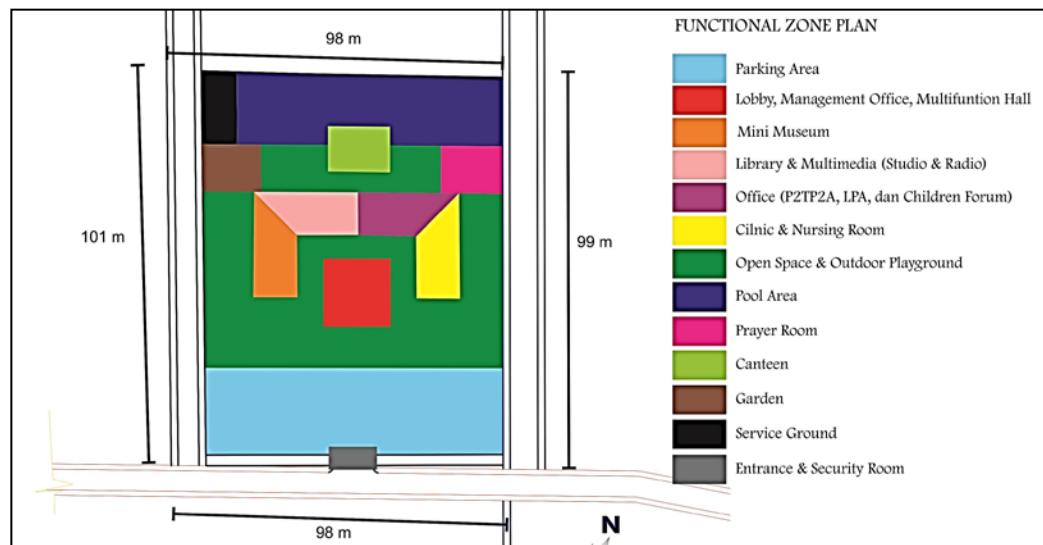


Figure 3: Building Layout Concept.

4.3 Concept of Space Needs

In the design of the North Lombok Smart Park, several things need to be considered in developing the design concept, including:

1. User Group

Smart Park, North Lombok, must be used by various user groups because children who visit are accompanied by those who are older (parents, grandparents, etc.). Also, several facilities are provided for users with different age ranges. Facilities such as clinics can also be used for mothers and adolescents.

2. Building Functions

Several types of buildings will be built, among others, Mini Museum, Art Studio, Reading Park, Office (for the Protection of Women, Child Protection Institutions, and Children's Forums), Health Clinics, Mosque and service buildings supporting the area. The concept offered to accommodate these different functions is an integrated mass order with good circulation.

3. Green Open Space

It applies the concept of being environmentally friendly and sustainable. For example, one application is to place many green open spaces in the Smart Park area. The idea used in the green space area is divided into 2, namely:

- Active Open Space: is an open space with elements of activities in it, for example, playing, learning, sports, and activities carried out by other users.
- Passive Open Space: is an open space that does not contain elements of human activity. Passive open space is preferred for visual aesthetics and ecological functions. However, this passive open space can also be used as additional facilities, such as vehicle parking.

The following is estimated in space obtained from the translation of the concept of space requirements and analysis. Assuming the area of this space is the minimum area needed to meet the standard according to the function of each building/facility.

1. Main Building

The main building (Table 1) became an icon of the region built in the middle of the region, the function as a center for information about the area's facilities and the area's management center. This building merges the Multipurpose Hall, which can be used as a meeting place and art arena such as dance, theater, and soon. Like the main building, the Main Building design must be eye-catching and apply the traditional architecture of North Lombok. Becingah became part of the building facade, accompanied by a variety of decorations that adopted local wisdom.

Table 1: Main Building Space Needs

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|-------------------|--------------------------------|------------------------------------|
| 1. | Lobby | • Receptionist | 40 |
| | | • Waiting room | |
| | | • Information | |
| 2. | Management office | • Administration | |
| 3. | Hall | • Meeting | 160 |
| | | • Art Performance | |
| 4. | Restroom | • Male Toilet | 24 |
| | | • Female Toilet | |
| 5. | Warehouse | Storeroom | 20 |
| 6. | Service Area | Circulation, maintenance, etc. | 40 |
| SUM | | | 296 |

2. Building 1 (B1)

The main function of Building 1 is as a Mini Museum (Table 2). This museum displayed educational collections for children. To display the collectibles, 96 m² of space/display area is provided. This museum is designed to be compact, with a small size but can accommodate attractive exhibition activities for children.

Table 2: B1 Building Space Needs

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|-------------------|--------------------------------|------------------------------------|
| 1. | Lobby | • Receptionist | 20 |
| | | • Waiting room | |
| 2. | Management Office | • Administration | 12 |
| 3. | Display Room | • Collection | 96 |
| 4. | Restroom | • Male Toilet | 12 |
| | | • Female Toilet | |
| 5. | Service Area | Circulation, maintenance, etc. | 20 |
| SUM | | | 160 |

3. Building 2 (B2)

The main function of Building B2 is as a library with the concept of a Reading Park and Multimedia Room (Table 3). Reading Park is designed with a reading room collection & reading room. With a 48 m² space area, the reading room collection area can include 1,000 books for 20 visitors. The multimedia room consists of Studio and Mini Radio. Space Studio Anak supports

information technology activities, the internet, the basics of teleconferences. In contrast, the Mini Radio Room is a facility to get to know radio technology, digital recording, and broadcasting.

Table 3: B2 Building Space Needs

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|-------------------|--------------------------------|------------------------------------|
| 1. | Lobby | Receptionist | 20 |
| | | Waiting room | |
| 2. | Management Office | Administration | 12 |
| 3. | Library | Collection | 48 |
| 4. | Studio | Studio | 24 |
| 5. | Radio Studio | Broadcasting room | 24 |
| | | Control room | |
| 6. | Restroom | Male Toilet | 12 |
| | | Female Toilet | |
| 7. | Service Area | Circulation, maintenance, etc. | 20 |
| SUM | | | 160 |

4. Building 3 (B3)

Building B3 (Table 4) is intended for several agencies/institutions' secretariats, including an integrated Service Center for Empowering Women and Children, Child Protection Institutions, and Children's Forums. Each secretariat room can accommodate 4-8 staff, with privacy even though it is incorporated in one building.

Table 4: B3 Building Space Needs

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|----------------------------|--------------------------------|------------------------------------|
| 1. | Lobby | • Receptionist | 20 |
| | | • Waiting room | |
| 2. | Management Office | • Administration | 12 |
| 3. | P2TP2A secretariat | • Office activity | 32 |
| 4. | LPA secretariat | • Office activity | 32 |
| 5. | Children Forum secretariat | • Office activity | 32 |
| 6. | Restroom | • Male Toilet | 12 |
| | | • Female Toilet | |
| 7. | Service Area | Circulation, maintenance, etc. | 20 |
| SUM | | | 160 |

5. Building 4 (B4)

Building B4 is a health facility in a clinic and daycare facility (Table 5). The health clinic is equipped with a consultation/counseling room and facilities to support mothers. The daycare center is equipped with a playroom and toys/equipment storage area.

Table 5: B4 Building Space Needs

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|-------------------|--------------------------------|------------------------------------|
| 1. | Lobby | Receptionist | 20 |
| | | Waiting room | |
| 2. | Management Office | Administration | 12 |
| 3. | Clinic | Health room | 96 |
| | | Nursing room | |
| | | Counseling room | |
| 4. | Daycare Center | Play Room | 56 |
| | | Toys Storage | |
| 5. | Restroom | Male Toilet | 12 |
| | | Female Toilet | |
| 6. | Service Area | Circulation, maintenance, etc. | 20 |
| SUM | | | 160 |

6. Swimming Pool, Canteen, and Service Area

The swimming Pool, Canteen, and Service Area (Table 6) are located in zone D, considering circulation and privacy. The swimming pool area has swimming facilities for children (under 10th years old) and teenagers (10-18 years old) separated between sons and daughters. The canteen is designed concisely, with an open area, accommodating a maximum of 40 visitors. The service area consists of a generator set, a water machine service, and a solid waste service located with special access.

Table 6: Pool Room need, Canteen and Service Area

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|--------------|---|------------------------------------|
| 1. | Child Pool | Pool for toddler | 90 |
| 2. | Teen Pool | <ul style="list-style-type: none"> • Male Pool • Female Pool | 300 |
| 3. | Pool service | <ul style="list-style-type: none"> • Changing Room • Toilet • Check Room | 120 |
| 4. | Canteen | Restaurant Kitchen | 100 |
| 5. | Service Area | <ul style="list-style-type: none"> • Generator set • Waste Treatment Plant | 32 |
| SUM | | | 642 |

7. The Mosque and Gardens

The mosque and gardens (Table 7) are located in zone D, between Zone C and the swimming pool area. The mosque consists of a 64 m² prayer room, an ablution area, and a 36 m² toilet. The garden is a facility composed of sunflower gardens and rabbit gardens, an attraction for gardening activities and animal lovers.

Table 7: The Mosque Need and Gardens

| No | Function | Accommodation | Min. requirement (m ²) |
|-----|-------------|---|------------------------------------|
| 1. | Prayer Room | Prayer Area Wudhu Area Toilet Waiting room | 100 |
| 2. | Garden | Rabbit Cages Sunflower Garden | 200 |
| SUM | | | 300 |

4.4 Concept of Space Needs

Circulation in the North Lombok Smart Park Area carries the concept of ease in exploring every part of the Smart Park area. This concept requires that there are paths that visitors can access from one facility to another. Space configuration is also very important. Therefore, the mass structure of the building will be designed so that the accessibility of the area becomes easy, affordable, and covers all areas.

The main building becomes the 'core' area connected to the surrounding buildings (B1, B2, B3, B4). The area is designed with easy circulation, well associated, and directly integrated with playgrounds spread out in the site's open space. Thus, the open spaces become facilities that are

integrating with the building. Starting from the entrance/parker, visitors can easily reach any facility they want to visit.

Landscape management becomes important and inseparable from the arrangement of circulation in an area. Softscape and hardscape designs determine the comfort of visitors and how they get a pleasant experience in exploring the region. Softscape is a landscape element consisting of elements of life, which includes flowers, plants, bushes, trees, and soon. The aim is to give landscape garden characteristics, create an impression, atmosphere, and sensitivity to the people around them. Hardscape is a hard landscape material built to form the atmosphere in an environment incorporated in the landscape. This hardscape consists of rocks, which are often used as supporters of the Park's beauty, for example, natural stone slabs with irregular shapes and compositions that can function as footpaths.

4.5 Architectural Concept

4.5.1 Building Mass Layout

The shape of the building greatly influences the impression and perception of people who see the building. Determination of the building form is determined by the function, character to be display, and existing local wisdom. The buildings in Smart Park North Lombok have interesting, attractive, and modern concepts without leaving the traditional architecture of North Lombok. One of the important elements in determining the composition of a building is the building façade like Children's Facilities in Pathumthani, Thailand (Figure 4).

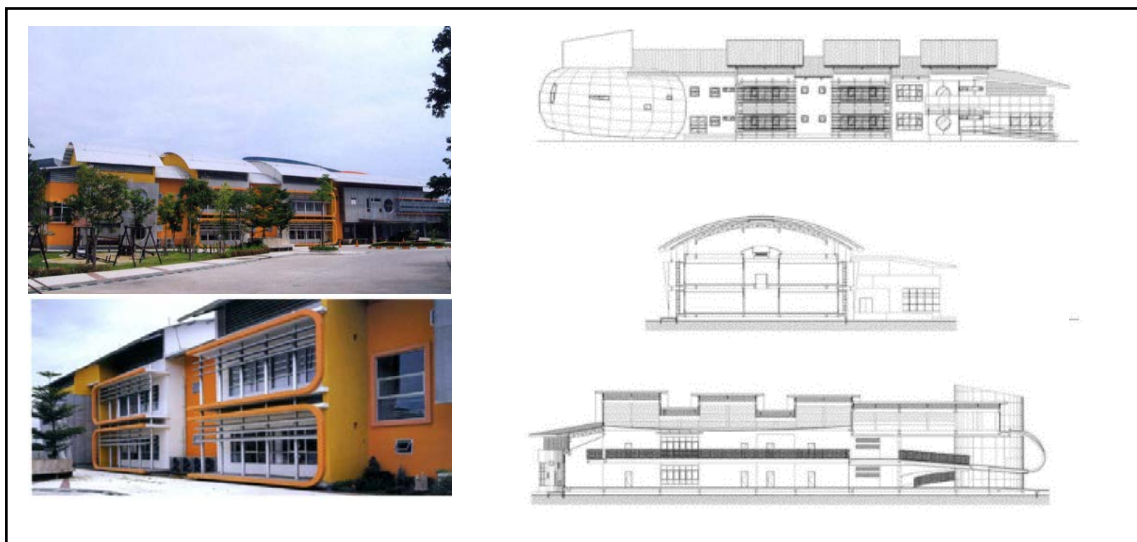


Figure 3: Examples of Building Facades for Children's Facilities in Pathumthani, Thailand (Dudek et al., 2007).

As an attractive facility designed for children, the building facade concept in this area is a facade that emphasizes creativity and dynamic. Especially for the main building, the facade is decorated with "Becingah" ornaments, a characteristic of North Lombok Architecture. Becingah is also philosophically a place of entry that has the concept of hospitality in welcoming guests. Furthermore, the shape of the roof resembles the roof of the Ancient Bayan Mosque (Figure 4), as a symbol of local wisdom in North Lombok.

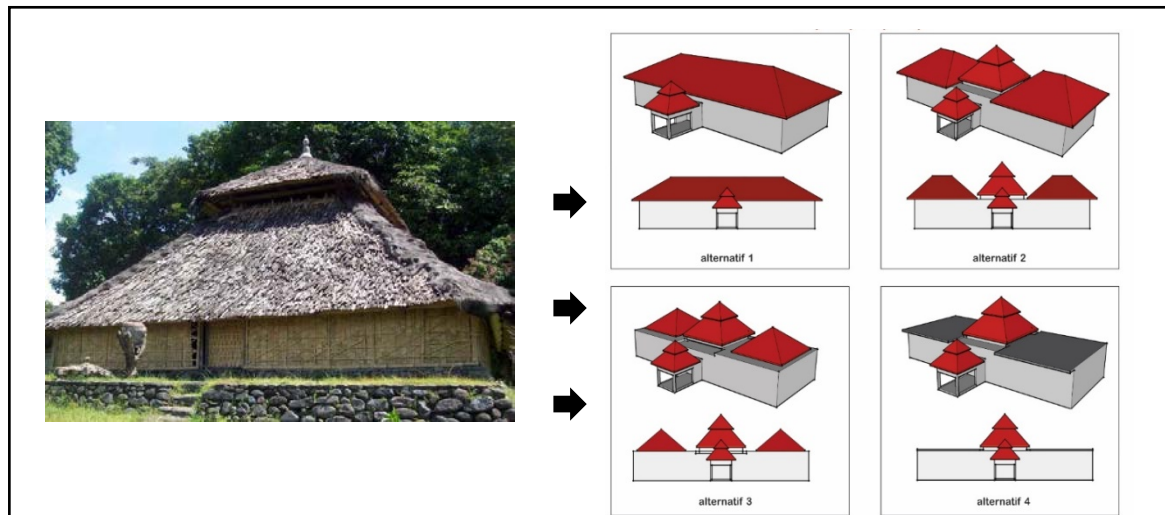


Figure 4: Applying the concept of Becingah from the philosophy of the Bayan Mosque roof

4.5.2 Interior

- 1) The facilities can be used for children. It must be by the needs at the age of the children. It is because dimensions and shapes must adjust to the user's age. The activities of children in the room are very concerned about dimensions, comfort, and safety.

To determine the exact dimensions, reference the existing standards. Facilities at Smart Park North Lombok are for children and some for adults. All furniture will adjust who uses it. Standard can refer to the Time-Saver Standards for Architectural Design Data. According to the Time-Saver Standards for Architectural Design Data, the following are the standard sizes for humans, adults, and children.

- 2) Furniture is one part of the North Lombok Smart Park infrastructure used in buildings and existing facilities. Judging from its function, the types of furniture can be group into:
 - a) A child learning support furniture, such as tables and chairs for children, cupboards or shelves for playground storage, children's lockers, display boards for children's work, shoe racks, bag hangers, etc.
 - b) Furniture supporting institutional activities, such as management tables and chairs, guest tables and chairs, cabinets, children's data storage racks, and others.
- 3) Furniture adapted to the needs and demands of children's activities in learning activities through play. For example, the number of lockers is adjusting to the number of children in an age group. In addition, the size and shape of the furniture are adjusted by the Anthropometry and Ergonomics factors.
 - a) Anthropometry learns how to determine furniture size based on the dimensions of the child's body.
 - b) Ergonomics learns how to determine the shape and size of furniture based on consideration of the convenience of students to carry out activities.

5) Several things need to be considered so that children are comfortable using tables and chairs, namely:

- a) The size of a child's chair leg height is the same as the child's foot length from the sole to the knee so that the sole is flat with the floor, and the bottom of the thigh does not compress the seat.

- b) Enough distance between the bottom of the table with the child's thigh
 - c) Position the elbow approximately the same height as the tabletop
 - d) Backrest for the back just below the shoulder blade
 - e) Sufficient between the backrest and seat area
- 6) Material selection must be made from local materials that are strong and easily available.
- a) For materials from wood, hardwoods that are not easily weathered are used, such as teak wood, mahogany, nyatoh, etc. For materials from metal or iron must be rust-resistant and strong.
 - b) For the selection of materials to be used must ensure the safety and comfort of children.
- 7) Recommended sizes (Astrini, 2005: 4, 9-10), namely:
- a) Tables of size $p = 120$ cm, $l = 75$ cm, and $t = 47-50$ cm.
 - b) Chair size $p = 32-35$ cm, $l = 27-30$ cm, and $t = 30$ cm.
 - c) The rack of educational equipment is $p = 150$ cm, $l = 40$ cm, and $t = 65$ cm.
 - d) The shelf for storing students' belongings (lockers) is a large rack with boxes. The size of each box, namely $p = 30$ cm, $l = 30$ cm, $d = 35$ cm, and $t = \pm 100$ cm (three levels).
 - e) The height of the table/shelf for activities carried out while standing is about 60 cm.
 - f) Height of reach of children to furniture, average 121 cm, maximum 133 cm.
- 8) Children's table and chair standards according to the Ministry of Education and Culture of the Republic of Indonesia 1992:

The following interior concept is expected in the buildings and facilities in Smart Park (Figure 5).

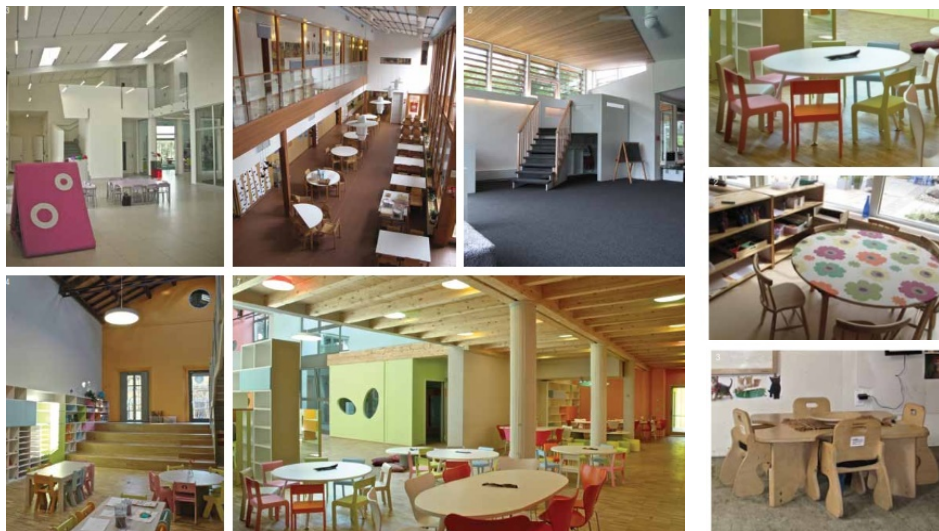


Figure 5: The Concept of Interior Children's Facilities
Source: Architecture for Children (2010)

4.6 Smart Park Design

Based on the deepening of concept and analysis, the North Lombok Smart Park design was obtained. Figures 6 and 7 show the design of North Lombok's Smart Park.



Figure 6: Masterplan of North Lombok Smart Park.



Figure 7: Children Play Facilities

5 Discussion

5.1 Smart Park

The Smart Park (Figures 6-7) is made to provide a vehicle and facilitation for children in improving mental and social development and will help children grow and develop to become diligent children. The benefits obtained with the existence of it are to overcome stress, increase growth and make children happy. Therefore, the concept of it is to create educational facilities, child-friendly areas, foster-friendly, safe, and open spaces that are comfortable to play in. This area

is also equipped with facilities that utilize technology and are designed with an earthquake-resistant structure.

5.2 Zoning

The zoning of the area is the initial activity that must be designed in structuring it. It is created to facilitate visitor activities in the zone based on visitor activity patterns. It is creating comfort for visitors by implementing environmentally friendly and sustainable concepts. It is made into four zones, the entrance and parking, the transition, the main zone (building and facilities zone), and the open space.

5.3 Space Requirement

The draft of the concept space requirements of the smart park includes the smart park to user groups, building functions, and green open spaces. The user groups must be considered by anyone who will take advantage, include the elderly and disabled. As for the function of the building, it can be seen from the needs of its users in this case for mini-museums, arts, reading places, children and women's shelters, health checks, places of worship, applied technology, and other supports. Green open space with an environmentally friendly concept to support a comfortable and provide peace of mind for visitors. There are two green open spaces: active open space (there are activities such as: playing, studying, sports, etc.) and passive open space (for aesthetics).

5.4 Circulation

The concept of circulation is to make it easy for visitors to explore every part of the smart garden area. The main building as the center of the zone is placed in the middle making it easier to access all corners of the area's functions.

5.5 Architectural Concept

The Smart Park, located in Tanjung City, North Lombok Regency, is the only smart park area plan in West Nusa Tenggara Province. It reflects the identity by applying vernacular architecture, namely traditional Sasak architecture combined with modern, attractive, and environmentally friendly architecture. Thus, it will improve the image of the region.

6 Conclusion

The existence of this Smart Park will provide a place for children and especially children from families who cannot afford to 1. Get the opportunity to learn technology, especially computer equipment; 2. Developing talent/artistic creations; 3. Gaining skills; 4. Opportunities to read knowledge books, storybooks in the village library; 5. Get a comfortable and safe playground; 6. As a place for recreation.

The Smart Park will provide opportunities for parents to increase their knowledge through technology (computers) and reading books, so they can accompany and direct their children in getting education/knowledge in it. Moreover, the existence of this Smart Park will meet the needs of children to support the city as a child-friendly city development location

In essence, the design of the Smart Park will help children's mental and social development well and make children healthier and happier. Children as the successor to the nation will become a reliable driver to develop towards a developed and prosperous Indonesia.

7 Availability of Data and Material

All information is included in this study.

8 Acknowledgment

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