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Application of Autism-Friendly Concept in the Interior Design Of Autism Self-Development and Therapy Center in Surakarta

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Abstract

The Autism Self-development and Therapy Center is a special service center for people with autism with the main focus on developing self-development and therapy activities as an intervention effort for people with autism. The comparison between the number of children with autism is not comparable with the availability of facilities. Judging from the environment and the physical aspect of the building, in terms of capacity, activity, and space requirements, many things need to be improved. One of the facilities that currently needs to be made available in Surakarta is a facility that accommodates self-development activities. Apart from that, there are still many facilities with poor building conditions, some interior elements, and even furniture that are dangerous and unsafe for autistic children. Design efforts that can be made include creating self-development and therapy facilities with an autism-friendly concept. The form of design application that will be used from this autism-friendly concept is adjusting the type, texture, and color of materials and furniture to suit the needs of autistic children by considering safety and comfort factors. Thus, the autism-friendly concept is currently the best solution to overcome problems in autism facilities in Surakarta. The design method used in this design is based on references by Ballast (1992), starting with the Programming, Data Analysis, Idea Development, and Design Method (Design Development) stages. Based on the design results from the discussion, it is hoped that the Autism Self-development and Therapy Center can be a solution to the problems of children with Autismdisorders and provide positive output for each autistic child.

Keywords: *Autism, Autism Friendly, Autism Self-develoment, Therapy Center*.

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INTRODUCTION

Handling children with special needs is currently a big issue that needs attention from various parties; one type of special need that affects children's lives is autism (Nurfadillah et al., 2022). Autism Spectrum Disorder (ASD) or autism is a developmental disorder in the human brain that causes low ability to communicate and interact and impaired imagination activities (Sujantoko et al., 2021). Symptoms of autism generally appear before the child reaches the age of 3 years, with the cause not yet known for certain (Rahayu, 2015). The treatment that can be done for people with autism includes various interventions, one of which is therapy, which is an important factor in the survival of children with autism (Ngaglik & Sleman, 2009). The lack of information on the proper handling and treatment of children with autism disorders can hurt children's growth and development (Rahayu, 2015). This is why children with autism need special services and facilities to optimize the potential of each autistic child (Mostafa et al., 2023).

Surakarta City has a good history of the emergence of disability rehabilitation in Indonesia (Nurfadillah et al., 2022). Since 2017, Surakarta City has been encouraged to become one of the models of disability-friendly cities in Indonesia (Rahayu, 2015). Based on data obtained from the Central Bureau of Statistics of Surakarta City in 2018, it was recorded that the number of people with autism was 116 people spread across four Special Schools and six Inclusive Schools (Aloei et al., 2020). However, most of the therapy facilities available in Surakarta have not fully met the needs that match the characteristics of each autistic child (Hidayat & Natalia, 2023). One of the autism facilities in Surakarta City currently not optimally utilized is the facility that accommodates self-development activites (Barakat et al., 2019). In reality, self-development activities are very important for autistic children because they can train children with autism to fulfill their own needs without depending on others (Dwinanda et al., 2022).

One of the factors that need to be considered in designing a good therapy facility is to pay attention to comfort; this can be created by adjusting interior elements to the characteristics of autistic children (Dwinanda et al., 2022). Children with autism disorders have several characteristics, including that autistic children are partially unable to communicate both verbally and non-verbally, do not know how to express what they feel, are very sensitive to touch (body touch or sound), and can rebel uncontrollably (Sakya, 2016). A bad example is if the facility does not fit the characteristics of autistic children, which will lead to hyperactive behavior such as running around without direction, jumping, and screaming (Yuill et al., 2007). Children who exhibit deficits because they feel restless, cry, and are less comfortable (Soebiyan et al., 2020). Meanwhile, a good example of the facility is the characteristics of children with autism disorders that children will tend to feel calm and focused (Ramadhan & Wibisono, 2012). Therefore, to provide comfort for children with autism at the autism self-development and therapy center, consider a good acoustic level, use soft colors with little texture, and adjust lighting and air conditioning per Indonesian National Standard (Gaines et al., 2016).

Children with autism can have difficulty understanding and responding to potential environmental hazards (Haryanto & Utomo, 2022). As a result, children with autism disorders are more vulnerable to accidents and unsafe situations. However, there are still facilities with poor building conditions (Mcallister & Maguire, 2012). After surveying two facilities for children with special needs, both have some interior elements and even furniture that are not safe for autistic children, some of which are the use of sharp aluminum materials on the doors and windows, the absence of the use of anti-slip mats on steep floors and the use of furniture with sharp corners (Panero & Zelnik, 2014). All these problems can cause injuries to autistic children that cannot be controlled. Therefore, the autism self-development and therapy center will be designed with non-hazardous materials, maximizing padded protection on the walls and floors, using furniture with blunt edges, and calculating children's anthropometry on each piece (Mohamed & Almaz, 2024). Creating a safe environment will not only protect children with autism from harm but also provide a sense of security and reassurance (Shareef & Farivarsadri, 2019).

In addition, the involvement of nature also plays an important role in the intervention process of children with autism disorders (Barakat et al., 2019). One of the three design strategies by Shan & Mei is the natural

interaction design strategy, which means the involvement of nature in the form of sunlight, wind, rain, colors, and bird songs (Habbak & Khodeir, 2023). Being in contact or direct contact with nature can provide cognitive, mental health, physical health, social, and emotional benefits (Barakat et al., 2019). This makes nature's involvement one of the elements that have a positive impact on the intervention process of children with autism disorders (Almeida et al., 2016). Therefore, the autism self-development and therapy center will present green open spaces such as a courtyard, outdoor playground, and therapy to provide direct interaction with autistic children with nature (Beatrice, 2023).

To ensure the safety and comfort of children with autism, this problem can be solved by using the concept of autism-friendly (K & Setiawan, 2023). In theory, autism-friendly can be defined as an awareness of social engagement and environmental factors that affect people with autism (Damayanti & Ardhianto, 2023). The application of autism-friendly in the interior means adjusting the type, texture, and color of materials and furniture to suit the needs and characteristics of autistic children by considering comfort, safety, and natural elements (Ansara, 2022). That way, children with autism disorders will feel safe and comfortable when carrying out various series of intervention activities at the autism self-development and therapy center (Rahayu, 2015). The application of the autism-friendly concept is expected to be one of the good solutions to overcome the problems in autism facilities in Surakarta today (Poon, 2020).

METHOD

The design methodology applied to this interior design process is organized based on references by Ballast. According to the scheme in Figure 1, This process is developed into two stages, namely programming and data analysis (Dahal et al., 2021). In the programming process, the general concept is developed based on the design objectives set for the user's needs. After the project topic is determined, it is continued with data collection through steps, namely literature study, survey, interview, observation, and documentation (chanda, 2022) (Kholis et al., 2023). A literature study was conducted to find out more about the relationship between interior design and children with autism disorders, some of which are about interior design, interior systems, autism spectrum disorder (ASD), Autism Self-development and Therapy Center, the concept of autism-friendly, as well as literature about the design location plan in the form of an overview of Surakarta City. After obtaining enough information from the literature, a survey of objects related to autism facilities was conducted. The survey process was carried out by looking for several objects that would be visited with the best conditions; in the end, the selected objects were the President Special Needs Center (PSNC) in Bekasi City and SLB-D / D1 YPAC in Surakarta City.

Furthermore, interviews were conducted with autism experts and behavioral therapists to obtain data related to autistic children and the design of good autism facilities (Setch, 2014). In the interview process, the topics discussed were related to the possibilities or design options used in autism therapy facilities to serve as one of the guidelines for designing this Autism Self-development and Therapy Center. The next step was to conduct observations to obtain field data related to the previously selected autism facilities in two locations: Bekasi City and Surakarta City (Zevalkink, 2021). Observation aims to provide an overview of the current state of autism facilities used and the suitability of the design used with the characteristics of autistic children. The last step is to conduct documentation by taking pictures during the observation, including the object's overall interior condition and autism facilities (Spradley, 1980).

The data that has been obtained is then analyzed to compile a systematic scheme consisting of zoning, grouping, space size, space organization, circulation flow, and relationship patterns between spaces. Zoning at the Autism Self-development and Therapy Center uses a radial form divided into four classifications of space: public area, service area, semi-private area, and private area. After zoning is formed, then grouping is done by grouping classifications of spaces that have similar zones and functions into one zone, namely Public areas that are open and accessible to the general public, such as lobbies and green open spaces. Service areas are activities that are public services, such as toilets and prayer rooms. Semi-private areas are not open; only certain people can access them, such as therapy and treatment rooms. Private areas that are not open are confidential

and can only be accessed by managers, such as offices. The amount of space is determined based on the number of users, furniture, and the circulation of user movements. Consideration of the amount of space is also made with standard calculations based on the Human Dimension (Panero & Zelnik, 1979) and Architect Data (Neufert, 2002) supported by the Regulation of the Minister of National Education of the Republic of Indonesia Number 33 of 2008 concerning Facilities and Infrastructure Standards for Extraordinary Elementary Schools, Extraordinary Junior High Schools, and Extraordinary Senior High Schools as well as Requirements for Doctor Practice Buildings by Healthcare and Hospital Consultant. Then, the space organization is carried out based on a cluster organization system by placing spaces that have functions or properties in harmony closely together.

Furthermore, the circulation flow is made by taking into account the physical condition of the users and the number of users. The circulation flow is divided based on the users, which include patients and therapy assistants, patients and clinic assistants, staff and therapists, directors, medical personnel, and security. After all the data is arranged, a pattern of relationship between spaces is formed, which is grouped and arranged based on the relationships between spaces, namely spaces that are directly related, spaces that are not directly related, and spaces that are not related. After passing the data analysis process, the next step is making technical drawings consisting of making initial sketches of design transformations, designing layouts or floor plans, designing ceilings and floors, sketches of furniture, axonometry, and sketches of various angles of space perspectives. She was followed by making technical details consisting of cutout drawings, furniture projection drawings, interior construction drawings, and furniture construction drawings. Then, 3D designs are made, and material schemes are prepared.

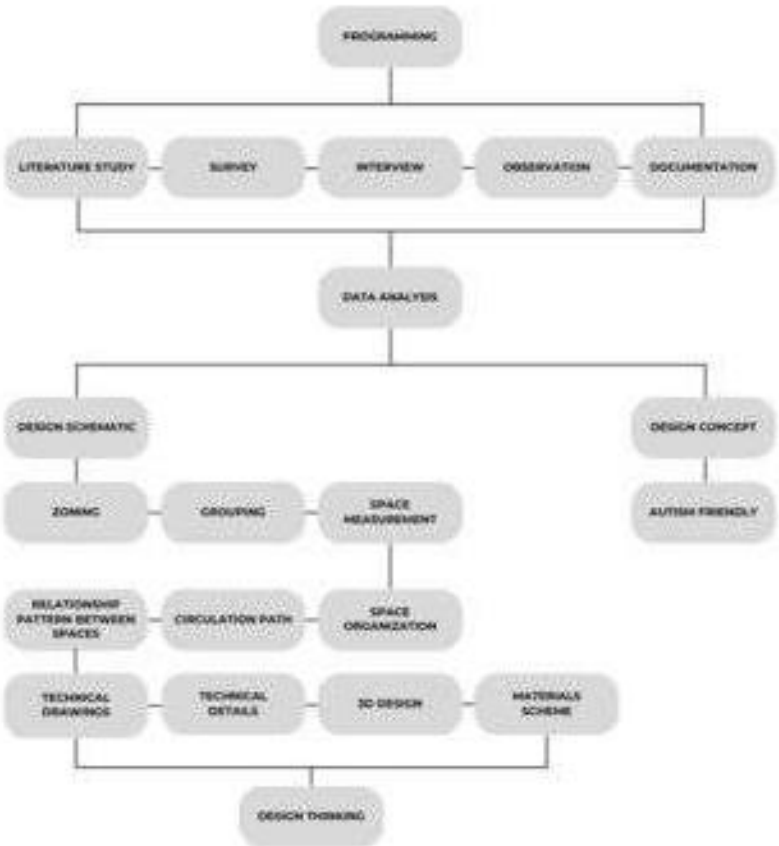

Figure 1. Scheme of Research and Methodology, creations by Shafa Syauqi A., 2024

RESULT AND DISCUSSION

Based on the problems that exist in current autism facilities, it is necessary to design an autism facility that can support the survival of children with autism disorders. Autism Self-Development and Therapy Center in Surakarta is a special facility for children with autism disorder that conducts a series of intervention and self-development activities. The main activities at the Autism Self-Development and Therapy Center are grouped into three based on their objectives: rehabilitation, education, and recreation, with several activities included, including self-help activities, therapy activities, medical treatment, skill, and social interaction activities.

Children with autism disorders have different levels of Autism, especially for some individuals with comorbidities that require special care and support. Therefore, improving the comfort, well-being, and safety of children with autism disorders is an important basis in engineering and design (Zaniboni et al., 2021). atQuoted from spectrumdisorder.com, Autism friendly can theoretically be defined as an awareness of social engagement and environmental factors that affect people with Autism. People with Autism are sensitive to sound, smell, light, and touch and even show unusual interest in some aspects of the environment. Therefore, an autism-friendly environment can help customize these aspects according to the characteristics of people with Autism. The following is a schematic of the ideas that make up the autism-friendly concept in Figure 2.

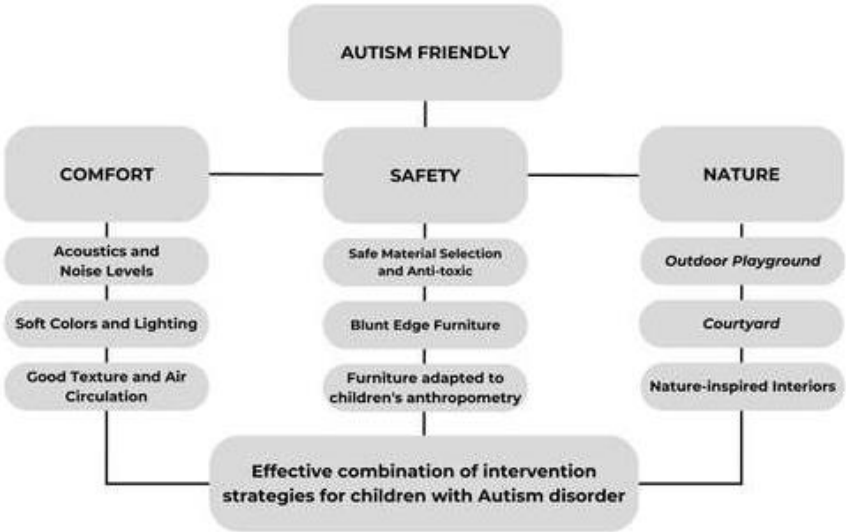

Figure 2. Idea and Concept Scheme, creations by Shafa Syauqi A., 2024

Comfort

The important elements that make up the autism-friendly concept include a comfortable, safe environment and the involvement of nature. A comfortable environment in the interior of autism facilities can be realized by considering several factors such as acoustics or noise levels, color and lighting, texture, and good air circulation (Habbak & Khoider, 2022).

According to the idea in Figure 2, one aspect that needs to be considered to provide comfort for children with autism disorders is acoustics or noise. Therefore, to realize a good acoustic level and by the function of the facility used as a place of therapy, in addition to the use of main materials and additional soundproof materials such as the use of walls with lightweight brick material, the use of carpet flooring, therapy mats, and padded walls as additional soundproof materials, another thing that needs to be considered is the layout of the space. Penataan ruang pada bangunan ini disesuaikan dengan zoning dan grouping yang telah ditentukan sebelumnya, yaitu diantaranya adalah area *public*, *semi-public*, dan *private*. Area *public* diletakkan dibagian depan bangunan sebagai zona penerimaan. Area *semi-public* berada pada bagian tengah dilengkapi dengan area

service yang menjadi pembatas antara area *semi-public* dan area *private*. Kemudian, area *private* diletakkan pada bagian belakang sebagai zona terapi dan staff. Dengan demikian, kegiatan yang dilaksanakan di area *private* tidak akan terganggu.

The one-on-one therapy room is a serious therapy room located in a private area and requires high focus. Hence, separating the one-on-one therapy room and the outside environment is necessary. In this facility, the one-on-one therapy room section is given a separation wall and also a transition room to protect children with autism disorders from the noise of the outside environment (Figure 3).

Figure 3. One on One Therapy Transition Room and Soundproof Wall, creations by Shafa Syauqi A., 2024

Children with autism disorder may perceive colors differently. An interior designer, Carolyn Feder, recommends using soft and calm colors (Figure 4) such as pale blue, soft green, muted purple, and pink. In addition, earth tones and neutral colors, such as ivory, beige, light mocha, muted teal, and soft gray, can be used, but not stark white, as it is not calming for children with autism disorders (Anous, 2015). The paint is easy to clean with little texture (Maulana, 2009). This is due to the uncontrollable behavior of children with autism, so if things happen that are not desirable or not what they should be, the walls will remain as neat as before.

Figure 4. Color Scheme, creations by Shafa Syauqi A., 2024

To realize comfort in this facility, the aspects of applied natural and artificial lighting have been adjusted to the Indonesian National Standard, which is calculated with the space area. Consideration of the area is made with calculation standards based on the Human Dimension (Panero & Zelnik, 1979) and Architect Data (Neufert, 2002) supported by the Regulation of the Minister of National Education of the Republic of Indonesia Number 33 of 2008 concerning Facilities and Infrastructure Standards for Extraordinary Elementary Schools, Extraordinary Junior High Schools, and Extraordinary Senior High Schools and Requirements for Doctor Practice Buildings by Healthcare and Hospital Consultant.

In natural lighting, to determine the number and size of windows according to the standard in each room, the WWR or Window Wall Ratio formula (Figure 5) can be used, which is then adjusted to the size of window openings and ventilation according to the Indonesian National Standard. In applying the autism-friendly concept, in addition to creating comfort, sunlight also includes natural elements that provide stimulation for

children with autism disorders. According to the Indonesian National Standard, it is important to calculate the need and size of windows. The windows in the therapy room are placed higher than the human view. In addition to reducing the risk of accidents, it will also increase the penetration of natural light into the room, which is good for children with autism (Beaver, 2007).

$$\mathbf{WWR} = \frac{\textit{Total luas jendela pada suatu fasade}}{\textit{Total luas dinding fasade tersebut}} \textit{x } \mathbf{100\%}$$

Figure 5. Window to Wall Ratio Calculation, photos by Togatorop, 2016

To apply the autism-friendly concept in artificial lighting for each room, it must be adjusted to the minimum average lighting level recommendations based on the Indonesian National Standard using the calculation formula for the number of lamps adjusted in Figure 6. The types of lighting used in this facility include ambiance lighting in the form of warm white LED downlights and decorative lighting in the form of hanging lamps, LED strips, and lighting therapy.

$$N = \frac{E \times L \times W}{\Phi \times LLF \times CU \times n}$$

Figure 6. Calculation of Lamp Quantity, photos by Daud et al., 2020

Another aspect that affects comfort is natural and artificial ventilation. Natural ventilation in this facility uses windows that have been calculated beforehand. In addition to the therapy room, the windows in this facility can also be opened as a source of natural air. As for artificial ventilation, as stated in SupportiveCareABA, children with autism are sensitive to temperature, so they need artificial ventilation, such as air conditioning, which can be applied especially in therapy rooms.

Safety

Then, to create a safe atmosphere in the interior of this autism facility, several criteria need to be considered, which include the selection of materials that are not flammable, not slippery, and not harmful to health, the use of furniture with blunt ends that are adjusted to anthropometry as well as the needs of children (Ramadhan & Wibisono, 2012). Soft materials such as vinyl and carpet are ceramic materials that are easy to clean, most of which have a rough texture. Hence, they are not slippery; wood elements are natural materials complemented by modern materials such as glass that have been adjusted (Figure 7).

Figure 7. Material Scheme, creations by Shafa Syauqi A., 2024

Thus, in addition to selecting appropriate materials, security in this facility is realized by protecting the walls and floors based on foam so that the texture is softer. Then, all furniture in the facility has blunt edges, and children's furniture is adapted to anthropometry and ergonomics. However, because the facility is also used

for teenagers with autism disorders, the therapy furniture is made adjustable so that it can adjust the body size of children to teenagers. The application of safety aspects can be seen in Figure 8.

Figure 8. Application of security aspects in the interior, creations by Shafa Syauqi A., 2024

To provide a greater sense of security for children with autism disorders, there are two other security aspects to this facility, which include a fire prevention system in the form of smoke, gas, and heat detectors, sprinkles, and fire hydrants and a crime prevention system in the form of CCTV (Closed Circuit Television) installed in every corner and room except private rooms. In addition to using this technology, security guards will also always be scheduled to patrol the entire building.

Creating a comfortable and safe environment will create the atmosphere from the autism-friendly concept, which is a comfortable, safe, and calming atmosphere (Figure 9). This atmosphere will result from paying attention to several aspects, namely the balance of natural and artificial ventilation, the balance of natural and artificial lighting, the selection of materials used in each interior element, and the presence of nature, such as plants around the facility. This comfortable, safe, and calming atmosphere aims to help children with autism build a good mood and keep away the trauma that arises when they are in this facility. Thus, all therapy activities and other activities will run well.

Figure 9. Waiting Room Ambience, creations by Shafa Syauqi A., 2024

One of the other facilities available at the autism self-development and therapy center is a clinic area with a pediatrician (Figure 10) and a psychologist (Figure 11). The clinic facility is provided with the hope of providing a sense of security for patients and companions; this is because if something unwanted happens, it can be treated immediately in a short time without needing to change places.

Figure 10. Pediatrician Room, creations by Shafa Syauqi A., 2024

Figure 11. Psychologist Room, creations by Shafa Syauqi A., 2024

Nature

In addition, the involvement of nature is very important for children with autism disorders. One of the three design strategies (Shan & Mei, 2020) is the natural interaction design strategy, which means the involvement of nature in the form of sunlight, wind, rain, colors, and bird songs (Habbak & Khoider, 2022). Thus, the presence of courtyards and outdoor playgrounds in this facility can be applied to realize good nature involvement. The outdoor playground is designed by adjusting the behavior of children with autism disorder, one of which is by having a structured flow (Yuill et al., 2005). There are outdoor game sets, but the outdoor playground provides an outdoor therapy area in the form of a mini garden and sensory texture walk (Figure 12) where children with autism can walk on surfaces with different textures. In addition, natural elements are also presented in the facility's interior; this is applied to bring nature closer so that every visitor can enjoy it.

Figure 12. Outdoor Playground and Therapy, creations by Shafa Syauqi A., 2024

The theme and form used in this building apply the transformation of the shape of water or waves. Waves. Quoted from Autism & Go, the stimulus provided by water is hard to beat; it can provide autistic children seeking stimulation in various ways, from visual and auditory to tactile. All of these elements become the ultimate attraction for many autistic children. One of these is the stimulation generated from waves. The crashing waves of the ocean are very attractive to autistic children. Visually, the swaying colors and lines are interesting to listen to; everything seems to go wrong, which is a stimulus for autistic children (Aquamobile, 2012). The following form is adapted from the ocean waves in Figure 13.

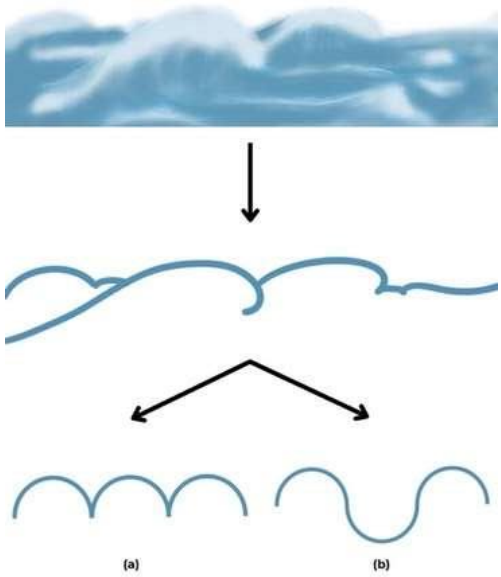

Figure 13. Form Transformation, creations by Shafa Syauqi A., 2024

The shapes produced by the waves tend to be wavy. Autistic children are visual learners who like geometric shapes, circles, and curves with processing that contains elements of order and clarity (Junita, 2009). The customized wave shape transformation results are applied as wall panels and padded wall panels, as shown in Figure 14 and Figure 15.

Figure 14. Application of Wave Shape on Wall Panel (Skills Room), creations by Shafa Syauqi A., 2024

Figure 15. Application of Wave Shape on Wall Panel (Lobby), creations by Shafa Syauqi A., 2024

To avoid distraction, most of the ceilings used are plain gypsum-based with ivory white paint finishing. However, the design is maximized in several spaces tailored to their functions, including the multisensory room. The ceiling decoration used in the multisensory room adapts to the shape of nature, namely clouds as a supporting element of natural elements in the interior (Figure 16). The ceiling is decorated to support children with autism in developing the ability to imagine well.

Figure 16. Multisensory Room, creations by Shafa Syauqi A., 2024

In addition to the multisensory room, what distinguishes the Autism Self-Development and Therapy Center from other facilities is the development of a special self-help room (Figure 17) where children with autism disorders can practice independence and do daily activities. The self-development room in this facility is

divided into two categories: the home simulation room, which trains children to do daily activities that are usually done at home, and the school simulation room, which trains children to behave well during learning. Both rooms are equipped with adjacent children's restrooms.

Figure 17. Self-development Room, creations by Shafa Syauqi A., 2024

CONCLUSION

The autism-friendly concept is applied by prioritizing three main elements: comfort, safety, and the presence of nature. Comfort is created by using materials, colors, textures, lighting, acoustics, and air circulation adapted to the conditions of children with autism disorders. Then, safety can be realized by using safe and anti-toxic materials and additional protection on the walls as well as floors and furniture with blunt ends that are adjusted to the anthropometry of children. This facility has an open space formed into a courtyard and outdoor playground that children with autism can use to enjoy nature. The overall concept is expected to be an effective intervention strategy for children with autism.

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