

Participatory Design Concepts for Autistic Children's Furniture Needs in the Behavioral Therapy Room using the ABA/Lovass Methods

Dwi Candra Purnamasari¹, Agatha Dinarah S.R², Sinta Sari M³

^{1,2}Product Design, Telkom Institute of Technology, Purwokerto, Indonesia

³Pusat Layanan Disabilitas dan Pendidikan Inklusif, Surakarta, Indonesia

candra@ittelkom-pwt.ac.id

Abstract

The concept of designing behavioral therapy furniture for autistic children must consider the character of autistic children and the therapeutic methods used. The physical environment that meets the needs of autistic children, especially furniture with adapted materials and shapes, greatly influences therapeutic activities. This study aims to implement the participatory design concepts as the basis for designing furniture for autistic children's therapy rooms. The participatory design concept is implemented in the materials and forms of furniture needs tailored to the needs of autistic children. Therefore, designing furniture can support the needs of autistic children in therapy.

Keywords

furniture; ABA/Loovas methods; autistic children



I. Introduction

Participatory design is a design approach to improving human values in the present and the future. The work process focuses on the human behavior of active users in their living environment. The users are motivated and empowered to be directly involved in every stage of the design process (Tumilar, 2019). In its design, the designers need considerations in making the design of the facilities made, especially special designs for the needs of autistic children.

In participatory design, user behavior must be considered as the basis of the design embodiment criteria. This means that in addition to user needs, what must be considered in a design is user conditions. Thus, the autistic children's therapy room needs to consider the behavior criteria and habits of autistic children. Autistic children have special behavior patterns. The therapy room must be able to meet the behavioral needs of autistic children. The condition of the users must consider the design embodied in the autistic child therapy facility.

Furniture relates to users with autism and therapists in the therapy room. Furniture in therapy is also adapted to its users. One of the methods used in autism therapy with good success is the ABA/Loovas method. Autism therapy uses a one-on-one system for autistic children and is starting to be widely used (Yuwono, 2012). The basis of this method is to use a behavioral theory approach (stimulus-response). This method teaches autistic children about obedience and skills in imitation.

The considerations or criteria in designing a behavioral therapy room are motivated by autistic children with behavioral disorders, both excessive behavior/active autistic children or deficient behavior/passive autistic children. Therefore, autistic children need behavioral therapy so that autistic children can reduce inappropriate behavior. Fulfilling space requirements in accordance with the function, user condition, and the therapeutic method's purpose positively influences child development. The purpose of this study is to

discuss the participatory design concept in furniture therapy using the ABA/Looovas methods as a reference for making furniture in the behavioral therapy room for autistic children.

II. Research Method

This study employed a descriptive qualitative research method with an evaluative approach. Qualitative research was defined as research that understood the phenomena experienced by research subjects in the form of descriptions in special natural contexts. The evaluative approach aims to collect data based on the implementation of policies that have been carried out (Arikunto, 2001). The following steps were taken to obtain the data: 1.) Literature study was conducted by searching for and studying papers from scientific journals and similar studies regarding a review of participatory approaches and supporting theories about the characteristics of autism; 2. The observations directly observed the condition of the interior environment, furniture, surroundings, and the children's behavior at the The Disability and Inclusive Education Service Center of Surakarta; 3. The interview was conducted with autistic children's experts regarding behavioral habits, space requirements, therapeutic methods, and furniture that supported therapy for autistic children.

III. Results and Discussion

The participatory approach was born in Scandinavia from trade unions pushing for more democratic control of the work environment (Ehn, 1989). The Cengage Learning Institute explains Participatory Design in the Ethics, Science, Technology, and Engineering journal. The users are made aware that they have an interest in taking part in building/developing an environment based on their needs. The users express themselves and participate directly and actively in the design development process in order to get what they really need and want more precisely (Tumilar, 2019).

The need for participatory design concepts can be obtained by knowing the characteristics of the users. In this case, the furniture users in the behavioral therapy room using the ABA methods are autistic children. Basically, Autism Spectrum Disorder (ASD) is a developmental disorder characterized by deficits in social interactions, restricted interests, and repetitive behaviors (Maenner, 2020). This is also evidenced by observations at the The Disability and Inclusive Education Service Center Surakarta. On average, autistic children still find it difficult to carry out social interactions and repetitive behavior habits.

According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; APA 2013), autism is characterized by three levels of severity, indicating the type of support needed from the person. Level 1 is a higher level of functioning; support is needed for individuals with inflexibility problems, poor organization, planning, switching between activities, poor social skills, and some communication and social interaction deficits. Level 2 is an intermediate level of functioning requiring substantial support for individuals who show marked difficulty in verbal and non-verbal social communication skills, extreme quirks, limited repetitive behavior, and apparent difficulty changing activities or focus. Communication is the process of delivering messages by someone to other people to tell (Hasbullah, et al: 2018).

Finally, level 3 is a lower level of functioning and needs substantial support because the individual exhibits severe difficulties in verbal and non-verbal communication, very limited communication, and odd and repetitive behavior. The quality of clinical evaluation has an important role in the diagnosis as well as the future of treatment (Serra et al., 2015). In particular, the clinical diagnosis of autism can be seen by combining information from individual observations with parental information (Pino et al., 2020). In addition, the diagnosis of ASD is based on symptom intensity and individual adaptive function (APA 2013; Pino et al., 2020).

Based on observations at the Disability and Inclusive Education Service Center of Surakarta, autistic children have various needs for therapy rooms, such as occupational therapy rooms, individual therapy rooms, snoezelen therapy rooms, speech therapy rooms, regular classrooms, and other classroom needs. Each room has different furniture needs. One of the differences in the use of furniture that only exists in Indonesia is the use of ABA tables.

The ABA tables have an oval hole on one side. At the The Disability and Inclusive Education Service Center of Surakarta, there are two types of ABA tables with half oval holes of different sizes. According to a psychologist at the The Disability and Inclusive Education Service Center of Surakarta, Mrs. Widyaningsih, a smaller table is used for small children, while a larger table is used for autistic children with larger body sizes. However, there is no historical information regarding the use of a table with an oval hole on one of the tables for the therapy of autistic children in Indonesia.

Based on the interview conducted with autism expert Dr. Joko Yuwono, M.Pd., the history of the table with a half oval hole on one side was first used by children with *cerebral palsy* disorders. Then, autism came to Indonesia, and this table was used as an ABA therapy table for autistic children. After use, autistic children make progress. The *cerebral palsy* table is known as a therapy table for autistic children. However, there is no specific provision for table use for ABA therapy or other autistic therapies.

Although there are no specific provisions regarding the use of tables for autistic children, there are several considerations as materials for designing furniture for autistic children, especially therapy tables, to meet the participatory design of therapy furniture for autistic children. Several considerations in the design elements and principles must be used in the design that affects the effectiveness of autism therapy.

Furniture design for autistic children must accommodate the differences in the needs of each autistic child. Furniture for autistic children can adapt to user needs (Paron et al., 2020). The consideration in terms of color, material, shape, texture, and size are needed considering the different sensory needs of autistic children. Autistic children tend to have less controllable movements, such as pushing a table during therapy (Purnamasari et al., 2020). Psychologist at The Disability and Inclusive Education Service Center, the therapy table for autistic children is light, easy to move, and can be moved considering the characteristics of autistic children who have active tantrums. Make it easier for autistic children to get off the table or for therapists to condition the table based on the child's condition.

Autistic children also tend to have repetitive movements and sometimes have movements that are difficult to control (Yuwono, 2012). Therefore, according to interior expert Dr. Rahmanu Widayat, M.Sn., autistic children require special security for interior facilities, especially furniture used for autistic children. For example, the removal of sharp corners in the furniture for autistic children. Mattresses on the therapy floor and the walls of the therapy room are needed to minimize autistic children from being injured when using therapy facilities. The manufacture of furniture for autistic children also considers

the needs of users, autistic children, and therapists. The needs, safety, and comfort based on an empathetic design must also be considered so that it can be used by everyone who uses the facility (Paron et al., 2020).

The material used should be easy-to-clean and light. Autistic children are easy run-around or push the table (Purnamasari & Purwaningrum, 2018). According to a psychologist, a dirty and dusty table can also trigger autistic children's tantrums, so furniture materials with easy-to-clean bases are more recommended for autistic children.

Based on an interview with an expert on interior materials, Ambar Mulyono, S.Sn, M.T, Ph.D., the materials that can be an option for use in making furniture for autistic children are as follows:

a. Plywood

Plywood is a composite product made of veneer sheets glued together in a perpendicular arrangement. The advantages of plywood are lightweight compared to its surface area, it can be made according to the desired size and color, texture can be made symmetrical, and fiber pattern can be uniform. The price of plywood is also relatively cheaper than teak wood or block board (Deti & Mulyono, 2017).

b. Blockboard

Blockboard is a small wood measuring 4-5 cm compacted into a sheet and given a coating. This compaction uses a machine. Blockboard has a thickness of 15 mm and 18 mm, and a width of 240 cm x 120 cm. However, this material is made of soft wood, so it is not too strong compared to the use of wood.

c. Wood

One of the wood types as an alternative material for making furniture for autistic children is teak wood. The character of teak wood has strong advantages and is suitable for autistic children. However, due to the limited availability of quality teak wood in the market for the last 510 years, craftsmen are forced to use superior teak wood, fast-growing teak wood widely planted by the community, and comes from young trees under 10 years old as raw material. The quality of superior teak wood is lower than conventional teak wood. According to Suryadi (2002), almost 100% of the teak wood furniture and furniture industry on the island of Java utilizes superior teak wood, whose availability is quite abundant. Superior teak wood furniture tends to be easily attacked by termites and dry sawdust and is less stable (Wahyudi et al., 2014).

d. Metal

Iron is a suitable type of metal for children's furniture because one of them is strong and resistant to weather (Tjahjono et al., 2017). However, from an interview with a psychologist, Sinta Sari M, sensitive autistic children to iron temperatures in a cold room will have an adverse effect if touched by autistic children. Therefore, it is better if this iron can be used as part of the framework on table legs or in areas that are not in direct contact with autistic children.

e. Plastic Fiber

Plastic fiber is frequently used material in early childhood furniture, especially for autistic children. The fiber material is lightweight, easy to maintain, and easy to develop for industrial scale. However, sometimes, the construction is not strong enough and requires iron for the structure of the plastic furniture legs so that it can withstand the load so as not to harm (Tjahjono et al., 2017).

In addition, a necessary consideration in participatory design is construction. The construction used for autistic children should use strong materials. The materials that are easily damaged will disturb and endanger autistic children. According to the interview with an expert, Ambar Mulyono, S.Sn, M.T, Ph.D., it is advisable to choose a strong structure to withstand the load and be used for a long time. This considers the movements that autistic children make when using a table. For example, the movement that autistic children do during video observation. Autistic children try to get out of the desk chair past the top of the table; this kind of movement is one of the considerations for making furniture construction for autistic children.

Materials that can reduce the temperature when in contact with autistic children are good to use. For example, using wood for autistic tables and chairs, besides being strong, can also reduce temperatures. Using table mats can prevent autistic children's feet from contacting the tiled floor directly. According to a psychologist, Sinta Sari Martaningtyas, S.Psi, M.Psi., this can make autistic children more comfortable in therapy. From observing the movement of autistic children, furniture for autistic children must pay attention to its construction. The followings are some constructions commonly applied to furniture (Jamaludin, 2014; Tjahjono et al., 2017).

a. Panel

The material used is usually in the form of particle board or plywood, which is formed into a plane, so it is called a panel. The construction used can be in the form of joint dowels or screws and bolts so that the furniture can be disassembled.

b. Wood Connection

There is a mortise and tenon connection, and the connections are dove-tails. Autistic children are easily influenced by focusing on prominent shapes. Preferably, in the use of autistic furniture, it is recommended to use the Form Follow function design principle. This principle is intended so that the furniture for autistic children does not dominate the focus of autistic children during therapy. Form follow function is a famous proverb coined by architect Louis Sullivan (1856-1924). It articulates the principle that the form of a building or object must be directly related to its function or purpose (Hwang, 2020). Using the form follow function principle will make furniture for autistic children more effective.

Several forms of early childhood furniture can be applied to furniture for autistic children (Nurzuraicha, 2009; Tjahjono et al., 2017):

a) Circle

The circle is a centralized form and is generally stable and naturally becomes the center of its environment.

b) Triangle

The triangle indicates stability. If it lies on one side, the triangle is a very stable shape. If placed at one corner, it can also appear unstable and tend to fall on one side.

c) Square

It shows something pure and rational, straightforward, and solid. It is a neutral static form and has no particular direction. In addition, using interesting forms of developing elements in the natural surroundings, such as plants and animals, will be very helpful and stimulate growth and development and all creativity possessed by children (Nurzuraicha, 2009).

There are several cases of autistic children who are sensitive to strikingly hypersensitive colors (Paron et al., 2020). This can interfere with the course of therapy. According to psychologists Sinta Sari Martaningtyas, S.Psi, M.Psi, and Widyaningsih, S.Psi, M.Psi., too flashy color can distract autistic children from not focusing on the therapist. It is recommended to use soft or natural colors such as wood colors. It can also use unfinished wood or use natural paint.

Furniture for autistic children can use a variety of colors. However, it is recommended to choose tertiary or quarterly colors with a major high key or minor high key value. The major high key carries the emotional character of being bright, positive, encouraging, and cheerful. While the minor high key brings a subtle emotional character, feminism, and brooding. The selection of subtle colors makes autistic children who tend to be hypersensitive to color remain comfortable. Finishing furniture is recommended for children and can also be used for autistic children in order to apply the appropriate colors. Adding color and texture to furniture can add to its aesthetics. Finishing can be done with several techniques (Tjahjono et al., 2017).

a) HPL (High-Pressure Laminate)

HPL (High-Pressure Laminate) is a coating material used for finishing wood furniture. It features a smooth finish, and a wide variety of textures are available. HPL is widely used in autistic schools in Indonesia. However, it is recommended to use this finishing to choose natural colors, such as wood colors.

b) Water-based finishing

This water-based finishing uses paint with a mixture of water as furniture finishing. This paint material is more environmentally friendly and has a natural feel.

c) Powder coating

Powder coating is dry paint in the form of powder. This material has advantages such as producing a perfect coating quality with varied textures.

d) PU (Polyurethane)

This material has advantages in terms of resistance to water and high heat, and PU with a water-based type is safer for children because it does not use chemicals but water.

e) Duco paint

This material has advantages such as not emitting a strong odor and being resistant to weather changes, as well as a smooth surface, safe for use by autistic children. However, the disadvantages of using Duco paint are relatively expensive.

In designing furniture with a participatory design concept, apart from considering the material, one of the successes is from the autistic child therapist. From the results of interviews at The Disability and Inclusive Education Service Center of Surakarta, the success of therapy comes from the therapeutic tools used and how the therapist does therapy for autistic children. Therapists who have experience and special strategies for dealing with autistic children will further influence the effectiveness of therapy success. Both are very influential on the success of the applied therapy results apart from the participatory design concept applied.

Other supporting factors for the success of autistic individuals apart from considerations on furniture design require participatory designs, designs with the unique needs of each child. Autistic children also require a highly controlled environment with little sensory input, low use of color, and high acoustic attenuation (Paron, 2020). An uncontrolled environment is one of the factors that trigger the behavior of autistic children with tantrums. The most visible behavior triggering factors is the characteristics of severely autistic children, namely angry behavior disorders, self-harm, attacking friends,

and damaging and destroying their toys (Hariyani and Siswanto, 2022). Therefore, it is necessary to pay attention to the factors that support therapy with the participatory design of furniture and other factors such as controlled environmental factors and appropriate therapists to meet the therapeutic needs of autistic children.

IV. Conclusion

The therapeutic needs of autistic children require special facilities to adjust the autistic children's character. Autistic children have their own world and have tantrum behavior, irritability, self-harm, attacking friends, and destroying their own toys, especially in severely autistic children. With the participatory design concept, autistic children can get facilities that suit their needs. The participatory design of the work process focuses on the human behavior of users who are active in their living environment. The participatory design applied is the design of the therapy furniture for autistic children. Suitable furniture from the analysis results is to use easy-to-clean materials and light, do not have flashy colors, and do not use shapes with sharp corners. This makes autistic children not easily distracted due to the use of striking colors or shapes that can be distracting when autistic children use therapy furniture. With participatory design considerations, it supports therapy with a design that adapts to its users, in which child therapy is better and more effective.

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