

## **BEHAVIOR AND COLOR APPROACH IN DESIGNING VOCATIONAL TRAINING CENTERS FOR MENTALLY DISABLED IN PONOROGO**

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**ABSTRACT**

In Ponorogo, Indonesia, Vocational Training Center for mentally disabled is planned to be established to develop their skills. Architecture of Vocational Training Center for mentally disabled is supposed to be adapted to their characteristics, especially for mentally disabled in Karangpatihan village. According to the theory, color is able to affect humans' behavior, while the environment order is able to shape human behavior within. Based on this theory, the approach employed in the present study is behavior and color approaches. The problem is making a design of Vocational Training Center that suits the characteristics of mentally disabled in that village. Therefore, the method employed is hybrid. Thus, this scheme will provide a solution in the form of Vocational Training Center draft lifting locality and color combinations which are the result of experiment, so that produce Vocational Training Center which suits with the characteristics of mentally disabled.

**Keywords** : behavior, color, mentally disabled, Vocational Training Center.

## **1. BACKGROUND**

In Karangpatihan Village, Ponorogo district, there are about 98 adult with mental disabled who have low life skills and merely rely on the help of others to meet their basic needs. Adult with mental disabled is an adult who clearly has intellectual functions under normal and accompanied by the disability in making behavior adjustments (Soendari, 2009). Based on the condition, the local government of that village has been trying to empower the adults with mental disabled who are able to indulge in the village by establishing vocational training center which is filled with skills training. Their purpose is to develop mentally disabled to be more independent.

Talking about Vocational Training Center for mentally disabled, especially in Indonesia, Vocational Training Center there has no significant difference from the Vocational Training Center or training place for normal people. Treatments against them are limited to the treatment between coaches with mentally disabled, no architectural treatment. Yet according to Scott cited by (Laurens, 2005) argues that architecture should have humane purpose. Although mental disabled is a human being, similar to normal people but architectural treatment for them should be differentiated because of differences in ability and intellectual. Behavior education for mentally disabled is able to be modified by their environment (Ware, 1994). The environment where we live is a place where our lives are planned by a certain group of people with particular set of priority objectives at a particular point of time (Foxy, 1982). If the design process only considers the physical standards, it will allow a lot of failures in the design. Therefore, the task of the designer is to provide an existential grip for the users so it will help them make their dreams come true (Norberg-Schulz, 1968). Therefore, it will produce an architecture which humanize mentally disabled.

Humans can give meaning or impression on an event that occurs in the environment depends on a variety of stimuli/ sensory stimulus. Space requirement psychologically requires three aspects, which are stimulus aspect, security aspect, and space identity aspect (Lawson, 2009). Stimulus is the basis for the formation of human perception through human's sensing tools. Human behavior is created from human perception of the environment by using the sensing tools and experiencing the information processing in the brain which then creates behavior as a response. The simplest stimulus that could affect human psychology including psychology of mentally retarded is color. Through several architectural aspects, such as color, lighting, and the use of space, human behavior can be changed into capable and acceptable behavior (Ware, 1994). Color is the process of intuition and interest to some things. Experiments have shown that when asked to choose the same object between colors and shapes, children almost always choose colored objects.

Village environment plays an important role in shaping mentally disabled in behavior, it can be said that environment makes mentally disabled there become superior mentally disabled in general, especially for mentally disabled who are able to have activity. Inevitably they have to work to ease the burden on the family. According to (Mahnke, 1996), color is the part of the conscious and unconscious levels that have been fused in the attitude and characteristics of a person. Based on the considerations of the theories above, therefore the approach used is behavior and color approach.

## 2. THEORETICAL BACKGROUND

### 2.1. Mentally Disabled

The definitions of mentally disabled according to experts actually are all the same that mentally disabled is a person who has intellectual intelligence below the normal. Here are some definitions of mentally disabled according to some experts,

1. According to American Association on Mental Deficiency/ AAMD, mental retardation refers to significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period.
2. According to (Soemantri, 2006) mentally disabled is a term which is used to mention a child with development constraints.

### 2.2. Architecture and Behavior of Mentally Disabled

In a behavioral architecture book (Laurens, 2005) Scott says that the architecture should have a humane purpose. According to (Duerk, 1993) in his book entitled *Architectural Programming*, it is explained that the man and behavior is part of system that occupy the place and the environment which can not be separated empirically. Therefore, human behavior always occurs at a place and can be evaluated overall without consideration of environmental factors. In real life between humans and the environment have a reciprocal relationship, when humans create and shape an environment, the environment that will be created will shape humans' behavior. According to (Laurens, 2005) in research about behavior - environment, relationship between behavior and environment is one unit which is studied in a related condition. Therefore, what will be created is a cause and effect relationship of something which is produced by both of them.

One of behavior formers is the architecture, which architectural elements for mentally disabled should be similar and there is no difference from architectural elements for a normal person, but the quality should be higher. In a guide book *Design Facilities For the Mentally Retarded* (Roerke, 1965) mentioned that the most favorable environment for growth and development of mentally disabled is normal living environment with a family or in other houses in the society. The physical environment can have a strong impact and may determine the user. The environment where we live, where our lives are planned by a group of people with series of particular objective s priority at a particular point of time (Foxy, 1982).

### 2.3. Color Psychology

According to (Pile, 1995) color has symbolic meaning that is recognized by the subconscious, which affects the flow and the amount of energy in the body. Through several architectural aspects including color, light, and space, the behavior can be changed into good and acceptable behavior (Ware, 1994). Color can create a memorable space atmosphere, fun and so on, therefore psychologically it gives emotional influences (Pile, 1995).

Reviewing from the effects on the psyche and its distinctive nature, colors are divided into two categories, which are warm colors and cool color. Color between these two categories of color groups can be named as “*intermediates*”. In the psychology color schemes taken from *Oswald* color

wheel system, it can be seen clearly that warm color is culminated in orange (J), and cool color is culminated in turquoise (BH).

The psychological effect of warm colors, such as red, orange, and yellow give warm psychological, exhilarating, exciting, and stimulating. Cool colors, which are green and blue give calming psychological effect, peaceful, while purple brings depressing effect. While the white gives the effect of a clean, open and bright, black gives the effect of a heavy, formal, and unpleasant (Birren, 1961)

## 2.4. Vocational Training Center

Vocational Training Center is aimed for people who are ready to work. In fact, mentally disabled in Karangpatihan Village are adult with mental disabled whose productive job is only as workers with modest skills. The training program for this village occupies the terrace of the local volunteers' houses, and cannot accommodate people in large quantities. Thus, the development of Vocational Training Center is proposed. The selection of Vocational Training Center as the object of design is to directly empower mentally disabled, so they will be immediately ready to work. Definition of Vocational Training Center (BLK) according to (Permenakertrans, 2012) is a place where the job training for trainees is taking place, so that they can and take control of a type and level of competence of certain work to equip themselves in entering the labor market and/ or independent businesses as well as a training place to improve their productivity in order to improve their welfare.

## 3. METHOD

The design method used in this design is a hybrid method (Jencks, 1987). This method was chosen in purpose to combine behavior and color approaches.



Figure 1 Hybrid method, (Jencks, 1987)

The first stage is eclectic which means searching or enriching the treasury of information about both approaches. The second stage is modification, which means changing and customizing based on the architectural condition in which the colors have to adjust conditions as well as the psychological effects of what it is intended to apply, while the behavior by modifying the environment of mentally disabled in the village to be better. The third stage is combining, which means combining the two approaches to produce the expected results.

## 4. FINDING AND ANALYSIS

### 4.1. Data of the Area

The location of the area is located in the edge of the main road of Karangpatihan Village. The area is about 384m<sup>2</sup> width, with pxl size is 32m x 12m. Within the area, there are several buildings which will be occupied as Vocational Training Center (BLK) for mentally disabled, and catfish

pond. The area is south-facing, directly adjacent to the garden in the west, there is mentally disabled family's house in the northern part of the area, and the east is a small road access to the house behind it.

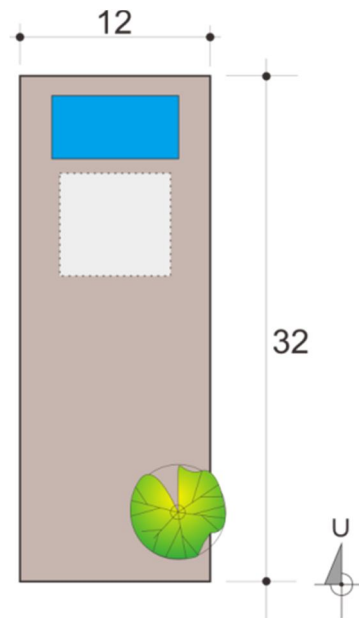



Figure 2 Site plan

#### 4.2. Analysis of Mentally Disabled Activity in the Architectural Element

To determine the architectural elements will be used to design the behavior of mentally disabled, then we made observations of the environment of mentally disabled related to the location they live, in the Karangpatihan village. The environment plays a major role in shaping the behavior of mentally disabled. If the design of Vocational Training Center (BLK) use environment which is extremely different from mentally disabled, there is a big probability that they will be difficult to adapt since mentally disabled does not have mental as good as a normal person. From these observations it appears that architectural elements will be the reference of the next design of Vocational Training Center. Therefore, in the table below, there is formulation of architectural elements that are directly related to daily activities of mental retardation. On the table, it is divided into two activities, which are the indoor activities and outdoor activities.

Table 1 Description of activity

No	Outdoor Activities	Description of architectural element
1	 <p data-bbox="329 600 591 632">Sitting in the terrace</p> <p data-bbox="313 898 607 930">Threshing corn kernels</p>	<ul style="list-style-type: none"> <li data-bbox="695 338 1289 478">– Some of the activities they are doing in the terrace are threshing the corn kernels, doing crafts, cleaning bikes, and doing nothing, just sitting on the floor.</li> <li data-bbox="695 485 1289 695">– Terrace is part of the building of a house but it is located at the outside of the house, attached with the building, still under the same roof of the house, there is only one side of the wall, floor elements follow the floor elements of the house.</li> <li data-bbox="695 701 1289 953">– One side of the wall use expose bricks material, as well as the <i>acian</i>, a combination of bricks and plywood, or just plywood; the material of roof use a framework of wood or bamboo, with clay tile; for the ground elements is from soil or stucco.</li> </ul>
2	 <p data-bbox="350 1251 570 1283">Drying the corns</p>	<ul style="list-style-type: none"> <li data-bbox="695 968 1289 1220">– Activity of drying corn is a part of the activities outside the house which is not roofed, or so called yard, located at the front of the house, the space created by itself from the border, between the outer wall of the house or terrace, with a border of the house lot.</li> <li data-bbox="695 1226 1289 1402">– One of the architectural elements which is created is space, and that space is outside of the house. Then commonly it is referred to outer space. The hallmark of outer space is not roofed but limited.</li> </ul>
No	Indoor Activities	Description of architectural element
1	 <p data-bbox="386 1845 532 1877">Take a nap</p>	<ul style="list-style-type: none"> <li data-bbox="695 1543 1289 1795">– Indoor activities during the observation are taking nap, lunch, and cooking in the kitchen. Space elements formed in this house is by the borders on the boundary walls on all sides and roofed. They just use a sleeping mat in the walled and roofed room when they take a nap.</li> <li data-bbox="695 1801 1289 1900">– Cooking in the kitchen with walled, floored and roofed room. The material of the wall is from woods and woven</li> </ul>

	<p>bamboo.</p> <ul style="list-style-type: none"> <li>- They eat in a walled and roofed room without dining table, they eat on the floor.</li> <li>- The material of the wall is from expose brick, or combination of bricks and plywood, or woven bamboo. While the material of roof is from a framework of wood or bamboo; for the ground elements is from stucco.</li> </ul>
<p>Lunch</p>	


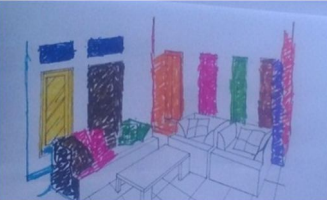


Source: field survey, 2016

Finally, the activity observed for 3 days produced the same interpretation of the architectural elements like normal people. The mentally disabled in the village do not require special architectural element but the quality should be better and support to improve their skill.

### 4.3. Analysis of the Color Selection of Mentally Disabled

In the theory, there is no specific color which is able to affect the psychology of mentally disabled. Not necessarily a particular color can affect the psychology with the same effect as the effect of color to the normal people. Through several architectural aspects including color, light, and space, the behavior can be changed into good and acceptable behavior (Ware, 1994). Thus the activities below are experiment in form of the selection color of mentally disabled in that village, to know how match the color selection of mentally disabled with the existing theory.

Table 2 Color experiment

Day	Suratun	Parmi
1		
2		

Source: field survey, 2016







From two-day observation to Mrs. Suratun and Mrs. Parmi, they prefer bright colors. In the interior images, there are several elements which are chair, windows, walls, tables, floors, and the seat cushion. Of all the elements in the picture, it appears that every element likely to be given in different colors. From the two pictures, the yellow color is more often found in both, beside that, pink became the second choice with fewer colors percentage. The next colors are green and blue. In



the second interior visualization with empty space picture which previously is described elements that existed in the image, the result is yellow, back into the main selection, where both mentally disabled use in different fields. In this color test, it still cannot be a standard element of color that corresponds to the mental retardation due to the limited time.

Based on the analysis above, the colors which are often selected by mentally disabled are yellow, dark blue, light blue, green, and pink. There are various kinds of color and nature of the two groups of colors above, which are summarized in the table below.

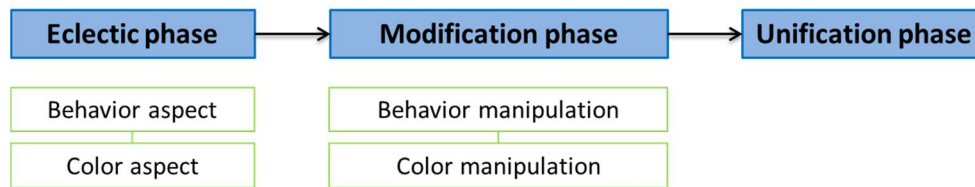
**Table 3** Color and characteristic

<b>C o l o r</b>	<b>C h a r a c t e r i s t i c s</b>	<b>C o l o r</b>	<b>C h a r a c t e r i s t i c s</b>
	(Red). Strength, motivation, extrovert, instinct, survival, security. (Beazley, 2000)		(Blue) Communication, imagination, inner strength, calm, peace, and tranquility. (Beazley, 2000)
	(Pink) Soft, Protective, loving (Beazley, 2000)		(Green) Honest, stable, reliable, kindness, compassion, care, and share. (Beazley, 2000)
	(Orange) Happiness, excitement, motion, and creativity (Beazley, 2000)		(Yellow) The color of passion, stimulating, invigorating, ego, will, intellect, feeling of detachment. (Beazley, 2000)

Source: Beazley, 2000

Color as a stimulus which is capable of affecting the psychological is one simple stimulus than other stimulants. Proved by assessment activity that researcher has conducted beforehand that from 5 disabled retarded who got the assessment, 3 of them immediately recognized the pointed color. Colors that are part of the environment and can transform human behavior through psychological effects that influence is very suitable to be applied for the setting of the behavior of mentally disabled. By those colors, it is expected that the mental of mentally disabled is more developed. Colors which will be used in the next design are the color that is written in the table above. Summary of the colors which are selected above will be applied in accordance with the illustrations that have been tested in the experiment. The colors will be used at least on the elements of the walls, and floors.

## 5. DESIGN EXPLORATION



**Figure 3** Hybrid method exploration sources: analysis result, 2016

### 5.1. Eclectic Phase

Eclectic phase here is the stage of enriching the treasury theories on the approach used. Basic theory that is not used is not just one, but a merger of several basic theory, which is behavior and color approach.

The first consideration is the behavioral aspects which according to (Foxx, 1982) the environment where we live, a place where our lives are planned by a group of people with series of particular priorities purpose at a particular point of time. Things like this are expected at the design of vocational training center later, in order to improve mental abilities and mental of mentally disabled the plan should be good. Good design is not enough for mentally disabled because the mental of mentally disabled is not as good as normal people, so when they are in a new environment, it is difficult for them to adapt. Most favorable environment for the growth and development of the majority of mental retardation is the pattern of a normal life with a family or in other residential facilities in the local society (Roerke, 1965). Good environment will yield good results, including the environment which is formed by the design of Vocational Training Center. Education behavior of mentally disabled can be modified by their environment (Ware, 1994).

The second consideration is the aspect of color that serves as a stimulus for psychological development. Through several architectural aspects including color, light, and space, the behavior can be changed into good and acceptable behavior (Ware, 1994). Color can create a memorable space atmosphere, fun and so that psychologically give emotional impact (Pile, 1995). During the observation of the color test against mentally disabled in the village, the colors favored by mentally disabled is bright color, besides color is the media which is most easily understood by mentally disabled. The predominant color which is often used for coloring by mentally disabled is yellow. The nature of the color yellow is uplifting, stimulating, invigorating, ego, will, intellect, feeling and detachment (Beazley, 2000). Some other colors that become the next choice is red, green, pink, and orange. While theoretically there are no colors associated with the psychological impact of mentally disabled directly, but the colors used are colors which at least are mentally disabled 's own choice.

### 5.2. Modification Phase

Modification phase is in the form of proposals and design concepts based on every aspect that has been described in the eclectic phase.

**a. Behavior Modification.**

1. The first concept is to prepare a backrest when mentally disabled breaks after training activities. This consideration arises because during the observation, mentally disabled always use their spent time to sit in their terrace. Their habit is sitting and leaning on the wall.

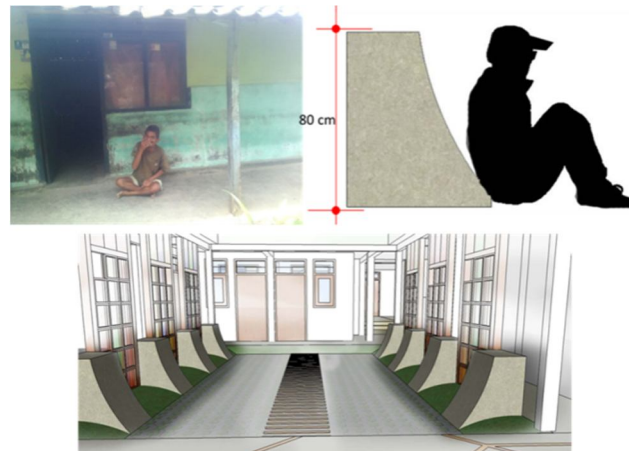


Figure 4 Backrest design source: analysis result, 2016

2. The second concept is to design a building of Vocational Training Center (BLK) which conform to local building styles. Consideration is mentally disabled is not good in adapting to the new environment, so that the design tries to design a new environment of vocational training center corresponding to the environment where they live in the village.

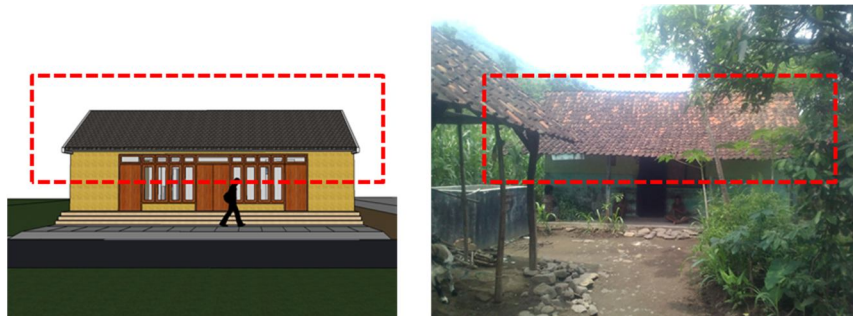
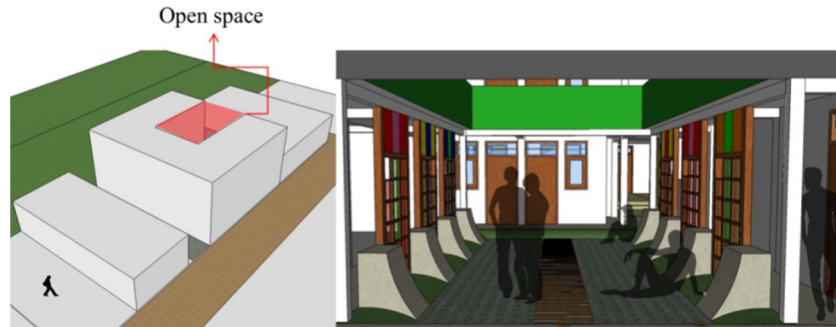


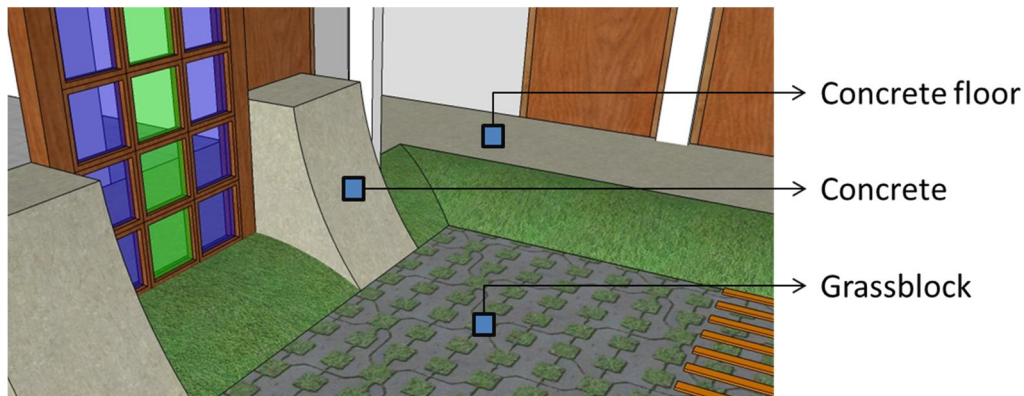
Figure 5 Local identity source: analysis result, 2016

3. The third concept is providing more open space. Seeing that mentally disabled in the village always doing activities outdoors, then the vocational training center is designed to bring open space to deliver the same atmosphere with the atmosphere in the village where they live.



**Figure 6** Open space design source: analysis result, 2016

4. The fourth concept is using the same material with their environment to give the same atmosphere with their house. Taking into consideration that during their lifetime, mentally disabled are in a simple home environment, then the design of vocational training center also adjust it with the better quality.



**Figure 7** Floor design, source: analysis result, 2016

### **b. Color Modification**

1. The first concept is using the color in the interior which have been selected by mentally disabled themselves. Interior for training for mentally disabled should be yellow. The nature of the color yellow is uplifting, stimulating, invigorating, ego, will, intellect, feeling and detachment (Beazley, 2000). However according to (Mahnke, 1996), if applied on the wall of the whole room, yellow will cause annoying characteristics.
2. The second concept is using the color which reflects nature color. The natural colors like leave green and brown reflect nature colors where mentally disabled live in the village.

### **5.3. Unification Phase**

Merger phase or unification phase is cooperating two different functions, and two different approaches. The need to develop the mental of mentally disabled, making facilities zone for mentally disabled in the first floor. In addition to mental development facilities, there are also facilities for the villagers and mentally disabled families, in the form of health care and psychological counseling.

The new environment for mental retardation is not always acceptable for them. In adaptation, they need quite a long time to understand the surrounding environment, and the possibility of failure would be greater. Thus the style of the building is adopted from the style of buildings in the local area. Building materials also took from the surrounding area.



Figure 8 Overall design, source: analysis result, 2016

## 5. CONCLUSION

In conclusion, designing for people having special needs, especially mentally disabled in Karangpatihan Village, is that we should design Vocational Training Center which is suitable with their environment which has shaped their behavior. Therefore, they would be said to be superior than mentally disabled in general, seen from their independence. The consideration from mental also should be concerned. Mentally disabled with mental under normal people cannot accept new environment directly. Therefore, the first building concept for mentally disabled is the form of building is not leaving the local identity in the village because mentally disabled are more comfortable with village atmosphere and they are easier to accept it. The second one is the color application in the training interior, which is the color which uplift psychological spirit, such as yellow, because theoretically yellow can uplift our spirit. However, application of yellow in the whole room will cause annoying effect.

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