

Behaviour Therapy in Nature Environment, and the Application in an Inclusive Education Curriculum

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Abstract: This study examined an application of behavior therapy done in nature and open environment in an inclusive education curriculum. This was a qualitative study, and descriptive method was used for analyzing the data. It was provided by a depth interview and observation to the data sources (students, teachers and therapists as informants, process of therapy, and documents). This study was done in one of schools of nature that provided an inclusive education for early childhood with neurodevelopmental disorders. The results showed that behaviour therapy in open environment, in that school of nature was delivered comprehensively to all of child developmental needs, through 6 main programmes namely root programme for sensory motor, stem programme for communication, leaf programme for social skills, flower programme for self-help & daily activity, and fruit programme for pre/academic & talents. The second result showed that the therapy was applied integrated with the curriculum in 3 settings, 1) individual therapy (focused on root & stem programme), 2) group therapy (focused on root & leaf programme), 3) classical learning activities (focused on leaf, flower, and fruit programme). The third result showed that the therapy was appropriately based on applied behavior analysis approach. Targets of behavior were broken down into small steps and many repeated opportunities were provided with abundant reinforcement.

1 INTRODUCTION

For the last decades Indonesian government has concerned more seriously on the special needs children through inclusive education policies. The problem is that not all inclusive schools in Indonesia are able to provide an adequate treatments at school.

Applied Behavior Analysis is one of therapies for children with special needs, that familiar in Indonesia. It has been proven as an effective method for children with special needs, but in most cases in Indonesia the therapy is set as an indoor activity in a formal settings. Research shows that contact and frequent experiences with nature have a major impact on the healthy growth and development of a child's mind, body and spirit.

The research was done in one of schools of nature that provides behaviour therapy integrated with the inclusive education curriculum. The purpose of this study was to examine an application of behavior therapy done in nature and open environment, in an inclusive education curriculum.

1.1 Children with Special Needs

Children with special needs is a term widely used in the field of education in Indonesia, to mention they who have barriers in their development. Meanwhile, in the field of psychology and health, it is known as neurodevelopmental disorders.

Neurodevelopmental disorders are a group of conditions with onset in the developmental period. The disorders typically manifest early in development, often resulting from the implications of personal, social, academic, or occupational functioning. The classifications are: 1) Intellectual Disability, 2) Communication Disorders, 3) Autism Spectrum Disorder, 4) Attention Deficit / Hyperactivity Disorder, 5) Specific Learning Disorder (Reading, Written, Mathematics), 6) Motor Disorders (included Cerebral Palsy) 7) Tic Disorders (A tic Disorders, and 8) unspecified or other Neurodevelopmental Disorders (DSM-V, 2013).

In everyday conversations among educational and health practitioners, there is often inconsistency

in using the term children with special needs. The term of children with special needs is often attached to the term of handicap, or disability.

The prevalence of special needs children tends to increase every year, however Indonesia has a very limited data. The reason is that the number of special studies on this issue is still very low. There are approximately 4.2 million children with special needs in Indonesia, with an estimated prevalence in the general population of 21.3% (2006 figures; South-East Asia Regional Office–World Health Organization, 2013).

Based on data from the Indonesian National Health Survey in 2012 (Ministry of Health of the Republic of Indonesia, 2014) the percentage of children with special needs in Indonesia was 81.81%, which was in primary school age and below (Early Age). It was only 14.4% from the overall number in educational institutions. Therefore, it needs holistic and integrated handling steps through integrated therapy with educational curriculum in school, especially in primary education level.

1.2 Applied Behavior Analysis

Applied behavior analysis has been demonstrated to be a treatment for children with autism based on over 40 years of supportive evidence in improving social behavior and communication, also in reducing levels of problem behavior (Lovaas, 1987). The evidence reviewed of applied behavior analysis indicates there are high positive benefits on children with autism and other neurodevelopmental disorders (Howlin, Magiati, & Charman, 2009; Ortega, 2010 ; Novak, McIntyre, Morgan, at all, 2013 ; Vivanti & Dissanayake, 2014).

Applied behavior analysis has been referred to as the treatment of choice for children with special needs in some therapy center at hospital, special education institutions, and inclusive schools in Indonesia.

1.3 Benefit of Nature for Child's Development

Children need to be outside, they need to explore to get many information and knowledge. Research shows that contact and interact with nature regularly have a major impact on the healthy growth of a child's mind, body and spirit.

Louv (2005) said that outdoor activities and positive stimulation through playing in natural

environment during childhood can foster happier, healthier, and more well-adjusted children.

It is important that children and young people are outside and using all their senses to actively explore, and make sense of their environment, so that they could have a sense of independence.

Davis (2004) stated that reconnection with nature is essential, for people's basic well-being. Individuals will feel more secure psychologically, thus it helps the work function of the nervous system to be more optimal.

Therapy at school should be integrated with academic activities, in a natural play environment setting. Children with special needs should not have to be placed exclusively in a special room, separated from their peers and social environment.

2 METHOD

2.1 Design

This was a case study research using a qualitative approach. Descriptive method was used for analyzing the data. All of data resources were collected by observation and depth interview, with semi-structured guide.

2.2 Place and Time

This research has been conducted at Baturraden School of nature, in Banyumas regency, Central Java, Indonesia. Sekolah Alam Baturraden (known as SABar), is one of schools in Indonesia that implements inclusive education through nature as a medium for learning practice, including as a therapeutic setting. SABar developed therapy which combines applied behavior analyses and nature environment education approach.

The research data retrieval process has been conducted for approximately two semesters, starting from July 2017 until the end of June 2018.

2.3 Subjects

Participants of this study were 3 students with special needs. They were selected based on certain criteria which was based on theory or operational constructs according to the purposes: 1) Student of SABar in 4 to 6 years old (preschool level), 2) They, who was diagnosed by registered clinical Psychologist as a child with a kind of

neurodevelopmental disorders, 3) They, who have received the therapy at SABar for at least 1 academic year, 4) They, who have barriers in behaviour development.

Those 3 participants were the primary data sources in this study. The secondary data sources were students who did not meet the criteria above, students, teachers, therapists, principals, and all supporting documents (curriculum, manual of the therapy, and developmental progress report of students).

3 RESULT

3.1 Students with Special Needs in Baturraden School of Nature

There were 38 students in SABar (preschool and elementary school), and 13 of them were children with special needs. They were diagnosed by clinical Psychologist as a child with neurodevelopmental disorders.

Table 1. Students with special needs in SABar.

Name (initial)	Disorder	Age (years old)	Sex	Start
1. Dar	Speech delay	6	Boy	June 2017
2. Bin	General developmental delay (brain cyst)	6	Boy	June 2017
3. Fat	ADHD	6	Boy	June 2017
4. Sya	ADHD	7	Boy	March 2018
5. Ce	Dyslexia	9	Girl	Jan 2018
6. Key	Deaf	7	Girl	June 2017
7. Rif	Down syndrome	8	Boy	June 2014
8. Yu	Cerebral Palsy	13	Girl	June 2016
9. Ak	ADD	8	Boy	June 2016
10. Dn	Disintegrative disorder	13	Boy	June 2013
11. Nn	Down syndrome	17	Boy	June 2013
12. Fen	PDD-Nos	12	Boy	Jan 2013
13. Fir	Learning Disorder	10	Boy	Jun 2015

3.2 General Overview of Baturraden School of Nature and the Therapy

Sekolah Alam Baturraden (known as SABar) is a School of Nature established by the year of 2011. It is located in Nepenthes Forest at the base of Slamet Mountain, at Banyumas regency. The school does not use pretentious building. The classrooms are made by bamboo and wood, called *saung*. Each class consists of five to fifteen children, mentored by 2 teachers. Learning activities runs every Monday to Friday from 07.30 to 12.00 for Preschool Class (age 2 for 6 years old) and 07.30 to 14.00 for Elementary Class.

SABar had been developed a package of therapy for their special students since 2011, and the manual of the therapy was internally published for parents of the students in 2013. The therapy was named as SABar Green Therapy.

SABar green therapy was used to modified several existing therapies, such as behaviour therapy, play therapy, and art therapy. However, in the development of the therapy, behavior therapy had been chosen as the primary approach, which was packed with nature as a medium and main learning resource for children.

The concept of SABar's therapy that used behaviour therapy and nature setting, can be seen in the Table 2.

Table 2. The concept of SABar's therapy.

Programme	Aspects	Activities
Root	Sensory	- Exploring activities (groping, and squeezing) - Standing & walking barefoot
Stem	Language & Communication	- Speech training (velum-muscle, lip & mouth exercises)
Leaf	Social Skills	- Initiating & building social interaction
Flower	Self Help & Daily Living Activity	- Self-serving in snack-time and lunch - Toilet Trainings
Fruit	Pre-academic & academic	- Knowing alphabet, number, colour, shape. - worksheet activities
Fruit	Talents & Life Skills	- Handicraft - Painting

Therapy in SABar was generally divided into 3 parts namely: 1) Individual therapy; 2) Group therapy; 3) Integrated therapy with classical activities. Here is an overview of one-week course of therapy that is imposed on a child aged 5 years with Attention Deficit / Hyperactive Disorder (ADHD) at SABar.

Table 3: Therapy programme for Ft (a child with ADHD, 5 years old).

Programme	Activities	Place	Type
Sensory Motor	Guided to : 1. Touching and groping (grass, rocks, soil, leaf, dried leaves) 2. Squeezing (leaf, dried leaves) 3. Standing barefoot (pedestal from grass, soil, and gravel) 4. Walking barefoot (pedestal from grass, soil, and gravel) 5. Picking-up objects with forefinger and thumb (gravel, resin seeds) 6. Walking on the boardwalk (board of treetrunk)	Schoolyard Resin forest	Group
	Following these instruction : 1. Toss 2. Shake hand 3. Clapping 4. Hands Up 5. Open and Close hand		
Communication	1. Showing eye contact Following these instructions : 2. Bubbling (“ba..ba..ba..”, “ca..ca..”, “lu..lu..lu..”) 3. Word Immitation (papa, mama, kuda, makan, minum, etc)	Saung for therapy	Individual
Social	Eye contact Greeting / say	Class activity	Classical

	hello Smiling at friends Shaking hand to friends Playing together	(indoor and outdoor)	al
Self Help	Having lunch / snack independently Opening bottle cap independently Wearing and taking-off bag & shoes independently Toilet training Putting the stuffs / equipment in its place	Class activity (indoor / saung))	Classical
Pra-Academic & Academic	Learning alphabet Learning number Counting Colouring Doodling with pencil	Class activity (indoor / saung)	Classical
Talents & Creativity	Listening music	Class activity	

Individual and group therapy were focused on the Root program to strengthen the child's sensory motor abilities, and on the Stem program to strengthen communication skills (including speech and language skills).

Individual therapy was performed indoors called saung. Saung is wooden construction of approximately 4x5 meters, shaped like a house with 4 stilts. Its walls, floors, and roofs are made of wood with two large windows that are always open. Just outside the window is the view of the green trees. There are not many things in the room. There is only one cupboard to put the equipment in, and one large mirror mounted on one wall.

The room looks spacious, quiet, and comfortable. Since it is located near the nature, there is only occasionally heard the sound of children doing activities in the schoolyard or surrounding resin forest without any sound of vehicles. The air is so cool and fresh with adequate sunlight.

Group therapy was performed by the child together with other children with special needs, guided by several therapists. One therapist was responsible for 2 children. Group therapy was carried out in open space. It focused on the surrounding environment by maximizing the potential of all the senses owned by the child.

The therapy programs of Leaf, Flower and Fruit were implemented integrated with classical activities. Here is an overview of the implementation

of learning activities in SABar for pre-school age children, including the implementation of therapy.

Table 4: Classical learning activities. (preschool class)

LEARNING ACTIVITIES	TIME	PLAC E
I. Welcoming Activity All teachers and therapists welcome every child enthusiastically, they greet students warmly	7 to 8 am	Schoo l yard
II. Opening Class & Morning Promises - Gathering with others, opening prayers, and stating commitment to rules at school - Apperception activities with light conversation	8 to 8.30 am	Saung
III. Integrated Thematic Activities <u>Example Activities at Week 25</u> EXPLORING SCHOOL ENVIRONMENT 1. Fantasy gymnastics, gymnastics that mimic the movement of trees 2. Walking barefoot on gravel pedestal and grass pedestal 3. Pulling out the weeds FINDING HIBISCUS 1. Walking along into the garden 2. Playing and working in a group “finding hibiscus” 3. Picking some hibiscus leaves and flowers 4. Counting them and finding the appropriate number BLOWING BUBBLES 1. Squeezing hibiscus leaves into the bowl with water 2. Squeezing them until frothy 3. Making bubble with hand from the hibiscus liquid WORKSHEET ACTIVITY 1. Making a collage from leaves and flowers of hibiscus 2. Writing down name and title 3. Spelling alphabet	8.30 to 11 am	Schoo l yard, garden
IV. Snack Time children serve themselves while eating, drinking, cleaning up the garbage and equipment	11 to 11.30 am	Saung
V. Closing - Teacher summarizes, gives feedback and compliment - Singing, and closing prayers	11.30 to 12 am	Saung

3.3 The Procedure of Treatment for Students with Special Needs

Before having the therapy, it had been explained about the general description of therapy integrated with learning in SABAR. Then, it will be explained about the steps of behavioral therapy process applied since the child entered the class for the first time.

Here is an overview of the therapeutic process flow imposed on special needs children in SABAR

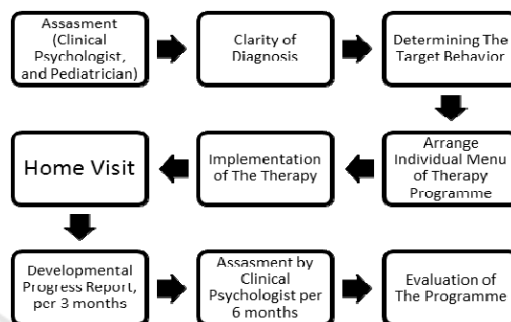


Figure 1: Process of therapy programme.

Assessment is the earliest stage which should be done before the child gets therapy. Initial assessment is conducted in a multidisciplinary manner by teachers and therapists, as well as other related professions namely Clinical Psychologist and Paediatrician.

It is sometimes found that prospective students had been already assessed and diagnosed previously by psychologists, psychiatrists, or paediatricians outside of school. However, preliminary assessment still needs to be done.

Developmental assessment by multidisciplinary may result in a firm diagnosis by the invited Clinical Psychologist to school. Psychologists also provide a record of recommendations on important matters that must be considered or followed up by family and school.

Psychological examination resulted from psychologists, notes from pediatricians (or psychiatrists if necessary), and assessment resulted by teachers and therapists were then discussed internally and then discussed by the school inclusion curriculum team. The discussions produced the child's primary needs in each aspect of development, which were then broken down into behavioral targets. Here is an example of a major developmental requirement of a child named Bin (initial) on baseline conditions and a list of behavioral targets in every aspect of development.

Bin is a 6 year old boy. Bin has got a Brain Cyst since he was born, which caused general developmental delay, although brain surgery had been performed to him.

Table 5: Example of the target of student’s behavior.

Aspects	Baseline	Target (first 3 months)
Sensory motor	- no response to the sound or touching - grasping (with guidance) - leaning toward a well-known person	Responding to exploration activity: standing barefoot (with guidance), touching, groping Following instructions: opening-closing hand, tossing, clapping, squeezing, shaking hand, waving hands
Communication	Crying mumbling (inadequate)	Following instructions: opening-closing mouth, sticking tongue out, gnashing teeth, inflating the mouth, blowing, smiling, laughing, saying words (e.g.mama, papa, mimi)
Social Skills	eye contact (inadequate)	Adequate eye contact, responding when someone called his name, answer greeting
Self-help & DLA	Unable	wiping mouth, holding a spoon, putting food into the mouth, holding a glass, drinking and sucking with a straw
Pre/Academic	Unable	Holding crayons and markers, doodling
Talents	Unable	Responding to the music sound, moving hands and fingers (finger painting)

Different behavioral targets for each child are based on developmental needs obtained from initial assessment results. The next stage was to design individual activities and group activities, which became a means of achieving each target behavior.

Positive and negative reinforcement were applied to achieve behavioral targets, and to maintain the behavior achieved by the child, to be consistent. The therapist in SABar did not use punishment for the consequences.

The types of reinforcement used for each child are different, depending on the child's interests and needs, as well as the child's thinking ability.

Table 6. Example of the target of student’s behavior.

Response Emergence		Reinforcement
None	=====>	No Reinforcement
Limited	=====>	Positive Reinforcement: - Positive word (e.g. yeeaaaah, good, great, amazing) - Big smiling - Holding child’s hand
More Adequate	=====>	Positive Reinforcement: - Positive word aloud (e.g. yeeaaaah, good, great, amazing) - Big smiling - Tickling child’s stomach

Behavior modification in this therapy also applied token economy technique. Token economy is aimed especially for target behavior on self-help ability. Here is the process of applying token economy in SABar.

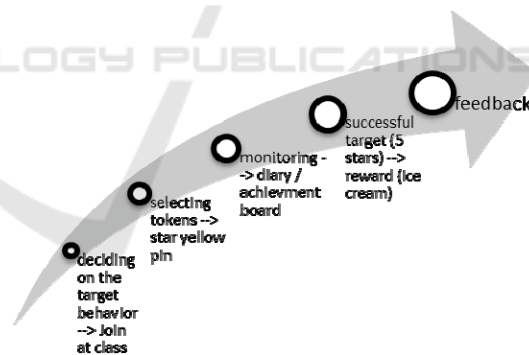


Figure 2: Process of the token economy

Classical therapy guides, integrated with classroom learning activities, were prepared by a teacher based on some suggestions from the therapists. The role of a therapist in classical therapy is to accompany and set the child to achieve his or her behavioral targets, especially social skills and self-help.

Measurement of child development was done continuously every day, inherent with the implementation of therapy. The measurement sheet

is a checklist, containing a list of behavioral and rating targets in the rating scale range from 1 to 6, with the following description: 1 = inadequate or inappropriate at all ; 2 = very limited; 3 = the development needs to be motivated ; 4 = sufficient development; 5 = appropriate or adequate in an optimal function ; 6 = excellent, consistent development.

Home visit was done to every child, 1 every 3 month, or incidental visit whenever needed. Home visit was done to see family support for child development achievement.

The daily, weekly, and monthly assessment process were then recorded into a child development report once in three months and it would be communicated with parents. If the child has consistently achieved his or her behavioral targets, then the behavioral target will be increased.

The initial and advanced behavioral targeting process were conducted under supervision of clinical psychologist, and paediatrician and psychiatric if necessary. A clinical psychologist will reassess children and do the counselling with parents on the 6th month.

At the end of the semester, therapists, teachers, and principals carried out the evaluation process to improve the quality of inclusion programs in the future.

4 DISCUSSION AND TECHNOLOGY

Serving the mandate of inclusive education is not easy, it takes a rigorous commitment, as well as strong multidisciplinary cooperation.

An effective inclusive education is more than a philosophy and more than a willingness to create a supportive environment. Teaching inclusively is a complex challenge and is most likely to stem from a coordinated, whole-school approach (McMillan & Jarvis, 2013)

SABar has shown this strong commitment for 7 years, from 2011 until now. Principals (kindergartens and primary school), teachers, and therapists, are able to work together and strongly committed to provide an effective inclusive education, including with involving a clinical psychologists and pediatricians, also parents and families.

At the beginning the primary vision of SABar was giving treatment and acceptance to every special child as well as other children without any specific obstacles. This vision is in line with the principle of Unconditional Positive Regard in the guidance and

therapy approach for children with special needs (Hallahan, 2001).

In most cases, therapy is addressed as an indoor verbal activity in which the relationship between therapist and client stands at its centre. Therapy in SABar for children with special needs uses a different approach. Nature environment is used not only as a therapeutic setting but also as a medium and a partner in the process. The therapy uses nature and other various objects in an open environment.

Reconnection with nature is essential, for people's basic well-being. Individuals will feel more secure psychologically, thus it helps to optimize the work function of the nervous system (Davis, 2004).

Louv (2005) stated that outdoor activities and positive stimulation through playing in natural environment during childhood, can foster happier, healthier, and more well-adjusted children. Kuo & Taylor (2004) in their study concluded that children with attention deficit disorder (ADD) showed a greater ability to focus immediately after spending time in nature.

The best results will be obtained when teachers are able to integrate learning in the natural environment with classroom learning strategies. Kuo & Taylor (2004) in their study concluded that children with attention deficit disorder (ADD) showed a greater ability to focus immediately after spending time in nature.

Nature has the power to help children grow and develop optimally, including those with barriers or developmental disorders.

The therapy in SABar is an intervention for children with special needs that uses a variety of behavioral strategies to teach developmentally appropriate and prerequisite skills. It is very compatible with the character of Applied Behavior Analysis (ABA) approach.

All skills of children behaviour were broken down into small steps or components, and learners were provided many repeated opportunities to learn and practice skills in a variety of settings, with abundant positive reinforcement (Kazdin, 2012).

The ABA therapy is generally given in a closed room, individually between a child and therapist, with various instructions that seem stiff. This can be an obstacle for clients and children who tend to feel bored quickly, awkward and uncomfortable with formal room settings.

The therapy at SABar applied ABA that was combined with nature objects and open environment.

While many empirical results show that ABA is a therapy generally chosen to handle children with special needs, there is still a critical about ABA

therapy. Germansky (2013) said that ABA involved a lot of repetition that is tough on the children. There are ways of manipulating the environment so that kids are more naturalistically learning a lot of positive behaviour skills. Children are more able to generalize skills learned in a naturalistic situation beyond the therapy sessions, therapist should take them out into the world with them.

A first key component of ABA is behavioral (Baer, et al, 1968; Newman et al., 2003). Applied Behavior Analysis is the systematic, controlled, and empirical investigation of socially important behavior using empirically validated research-based and socially acceptable practices (Cooper, et al., 2007, Newman et al., 2003).

The therapy at SABar provided observable and measurable studies about child's responses individually. Data were collected in an ongoing manner. In teaching situations, repeated measurement assisted in monitoring progress over time.

5 CONCLUSION

Behaviour therapy in open environment, in Baturraden school of nature was delivered comprehensively to all of child developmental needs, through 6 main programmes namely root programme for sensory motor, stem programme for communication, leaf programme for social skills, flower programme for self-help & daily activity, and fruit programme for pre/academic & talents.

The therapy was applied integrated with the curriculum in 3 settings, 1) individual therapy, 2) group therapy, 3) classical learning activities. The therapy was appropriately based on applied behavior analysis approach. Targets of behavior were broken down into small steps and many repeated opportunities were provided with abundant reinforcement.

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