INDIGENOUS SCIENTIFIC APPROACH IN BATURRADEN SCHOOL OF NATURE

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Abstract

Life skills, creativity, and analytical and critical thinking capability are crucial as a learning outcome for early childhood education programs. Unfortunately, there are some problems in the practice of learning for early childhood. Many schools only focused on academic outcomes, concentrating on pencil and paper activity, using worksheets every day, reading, writing, and counting as primary learning targets. There is much criticism about this phenomenon. The enormous social problems like violence, free sex, sex abuse, bullying, and drugs, have contradictory eastern Indonesian values. There is a wide gap between students and the character of local identity. These are also urgent problems for early childhood. Students are more familiar with western values through songs, films, games, and superheroes’ character. This study aims to describe the dynamics of an indigenous scientific approach based on nature in Baturaden Green School for early childhood students. Baturaden Green School is an alternative school that offers the exploration learning activity every day, with the heart as a media and learning resources, and insert the local wisdom with the scientific approach on the learning practice every day. Baturaden Green School is located on the foot of Slamet Mountain, which has many local values like myth, tradition, and the beauty of natural tourism destinations.

Keywords: indigenous, scientific approach, school of nature

INTRODUCTION

Indonesia had come to the era of globalization, which incredibly has a formidable challenge for its people. Human resources with excellent capability and competence of hard skill and soft skill are needed for this era. Academic achievement is not the main factor to succeed. The primary factor for people to survive successfully in this globalization era is authoritarian personalities, high competence of life skills, and the power of innovation and creativity. All of them depend highly on the quality of the educational system being applied.

Education has to be humanizing the human, creating someone to be wise, and increasing problem-solving capability. Meanwhile, the present application of the educational system in Indonesia is more oriented in sheer academic achievements. Even at the most basic, in early childhood educational programs (daycare for infants, playgroup, and kindergarten), parents and teachers would be more concerned about the ability of reading, writing, and counting.

Early Childhood Educational Programme should be a base where learning was given through explorative activities. Instead, most early childhood education programs focused on pencil and paper activities, using worksheets in almost all learning activities.

Indonesia was a country that has thousands of biodiversities and cultural diversities. Every region in Indonesia has genuine local characteristics. While a developed nation is a nation proud of its true spirit and identity, unfortunately, children are dragged away contrary to Indonesian values of local wisdom in the present day.

Modernization, awareness of global culture, and international knowledge are favorable for people and their development. However, it could not be comparable with omitting the treasure
of local wisdom and culture. The educational process should be a mediator between people (especially young learners) and its local culture. Indonesia needs an educational system that could be able to initiate the internalization of cultural richness.

**Early Childhood Education**

The study of early childhood development gained particular attention in Indonesia, especially since two decades ago. Early childhood in Indonesia is defined as preschool-age children, those who are below seven years old. Meanwhile, according to Hurlock (1997), early childhood is a group of people who experienced a unique development, namely those in the age range between 0 and 8. Neuroscience experts say that at this age, the child's brain is experiencing rapid growth. It can absorb various information very quickly.

Early age is usually called the golden age moment. A child has at least 10,000 nerve cells (neurons) in his brain. Each neuron will build 1 to 10,000 connections with other nerve cells through healthy food and positive stimulation provided by the surrounding environment, so practically, there will be billions of nerve cells in the child's brain. It causes early childhood to have the ability to absorb information very powerfully.

Santrock (2007) says that early childhood has unique developmental characteristics of the cognitive, linguistic, moral, physical motoric, and social, emotional aspects. His early age's quality strongly influences the successful development of a person in his adult life. Based on the above opinion, it is true that the early ages are the foundation times when the structure of intelligence and personality are formed.

Early childhood development optimization is highly dependent on the quality of assistance performed by the significant person of children, especially parents in the family environment and teachers in the school setting. Adequate positive stimulation should even be given to the children since they are still in the womb. Sufficient motivation will significantly affect the quality of developing the potential and ability of individuals in adulthood.

**A Scientific Approach**

Education is the spearhead of the creation of qualified human resources and the advancement of a nation. This is explained in The Indonesian Act No.20 of 2003 about the National Education System (2003), which reads as follows:

"Education is a conscious and planned effort to create a learning atmosphere and learning process so that learners actively develop their potential to have spiritual power, self-control, personality, intelligence, noble character, and skills needed by them, society, nation, and state."

Curriculum change is done to improve the quality of national education. The current Curriculum is the Curriculum 2013, including for Early Childhood Education. According to Mulyasa (2013), Curriculum, 2013 can be interpreted as a curriculum concept that emphasizes the development of the competence or ability to perform tasks with the specific standard performance so that the learners can find the results in mastery of a particular set of competencies. The cornerstone of the Curriculum 2013 is a scientific thinking approach known as the "Scientific Approach," which is an approach triggering and providing freedom or flexibility for students to be able to think scientifically through active participation in the five essential components of observing, questioning, experimenting, reasoning, and communicating.
Children at early ages have unique characteristics, either cognitively or emotionally, and their attitudes and behaviors. Early age is the most crucial age in the stage of human development because the early age is the period of laying the basic structure of personality, intelligence, and creativity built for all his life. The initial experience becomes crucial. The initial treatment received by a child will tend to persist and affect children's attitude and behavior throughout his life.

Early-age experts worldwide have agreed that young children need the right and fun stimulation according to their age and distinct development stages. Learning in the Early Childhood Education Programme includes teachers' techniques in teaching and interacting with children, which should refer to the principles of integrated Curriculum. The learning process must be active, creative, innovative, appropriate, and enjoyable following the stages and child development uniqueness.

Copple & Bredkemp (2009) says that the design of learning for early childhood should be appropriate. It should give children the freedom to get ideas and initiatives using a scientific and challenging strategy. Children are given vast opportunities to communicate with peers and interact with the environment.

Ironically, the process of learning in preschools today still focused only on children's cognitive and academic abilities, with a lack of creative and innovative activities. Most teachers often carry out their teaching tasks by relying on worksheets as a medium of learning. The child's opportunity to observe, question, gather information, associate, and communicate becomes very limited.

Piaget (1927) clearly said that children should be given the discretion to research through the immediate environment. Through trying and exploring, the child will find a lot of knowledge and skills. This is one of the foundations of the importance of a scientific approach in learning for early childhood.

The scientific approach provides flexibility for the child to observe. Observing is done by optimizing all the sensing device functions such as seeing objects directly, listening to the sound, tasting, smelling various scents, touching, pressing, squeezing, and feeling the texture of things around the child.

The scientific approach in Early Childhood Education Curriculum published by The Indonesian government of Education and Culture Department, especially Directorate of Early Childhood and Community Education (2015), aims to build a systematic mindset with a continuous series of processes. The scientific approach applied in the learning process begins with: (1) Observing using all the sensory devices to feel the sensations generated from the object or thinking ability, (2) Asking and make a question as to the process of giving space to the child to raise the curiosity of the thing observed. (3) Collecting information as a way to answer the interest. The process of gathering information is done by involving all the learning resources in the environment, not only limited to the teacher but also from the child's environment's direct objects. The next step is (4) Reasoning, namely processing the information collected to answer. Although the government has declared it, most preschool institutions have not yet had full awareness and willingness to apply a scientific approach. Some of the lessons applied are not child-centered. Teachers still use lecturing conventional methods and even ask the child to write a lot in worksheets.
Local Wisdom in Baturraden School of Nature
Baturraden School of Nature is placed in Purwokerto, specifically in the Baturraden District of Banyumas Region. Baturraden Green School was established by the year of 2011.

Baturraden Green school was located in the Nepenthes Forest of Baturraden district, at the base of Slamet Mountain, at around 15km from downtown of Purwokerto. The school does not use a pretentious building. The classrooms are made of bamboo and wood, called saung. Each class consists of five to fifteen children. Two teachers or facilitators mentor each small group. Learning activities run every Monday to Friday from 07.30 to 12.00 for Preschool Class (age 2 for six years old) and 07.30 to 14.00 for Elementary Class.

Baturraden Green School incorporates the 2013 Curriculum from the Indonesian Ministry of Education, combined with an Indonesian School of Nature curriculum, which is then enriched with local wisdom of Banyumas District, especially Baturraden District.

Below are the activities of instilling local wisdom implemented to the students of Baturraden Green School:
1. Welcoming activity
   The children’s earliest activity is a welcoming activity. This activity is done when the students arrive at school every morning. All teachers or facilitators welcome every child enthusiastically with friendly expressions. They should smile and greet the children who come warmly. Therefore, children could feel a sense of comfort and passion. The welcoming activity starts at 07.30 and finishes at 08.00. Students are welcome and invited to a conversation following the theme of welcoming every day.

   Special welcoming activities are conducted every Monday morning, with the internalization of local wisdom. Some of the teachers' local wisdom at special welcoming times are Kenthongan (Banyumas Traditional Music Instruments) and Wayang Orang.

   **Kenthongan** is a typical Traditional Music Instruments of Banyumas, with the **Kenthong** as the main instrument. **Kenthong** is made from bamboo pieces with holes elongated side by side. This can be played by beating with a short wooden stick. In general, **Kenthongan** is played by about 20 people and equipped with drum, flute, and **Kecrek** (another traditional music tool). A majorette leads this group. In a group of **Kenthongan**, **Kenthong** used has several forms, resulting in different sounds but harmony. The **Kenthongan** played by the teachers at Baturraden Green School is adapted to the condition of the school.

   The teachers welcome the students with **Kenthongan** music, and it makes the children seem very enthusiastic. They give many questions related to the **Kenthongan** played by the teachers. The teachers answer each question presented by the child. Accompanied by **Kenthongan** music, the teachers invite children to sing and dance together and give them a chance to play **Kenthongan**.

   Another welcoming activity that promotes local wisdom is **Wayang Orang**. The teacher uses a typical Indonesian costume, for example, **Gatotkaca** (one of the Wayanpresentedng figures), and then shows some jumping attractions such as flying, and introduces himself to the children.

2. Provide them with prayer Activity
   Dhuha prayer activity usually starts at 08.00. The students are motivated and guided by the teacher to queue up and have **wudhu** (ablution) together. Unlike the ablution in public
schools, which uses permanent water faucet from pipe and cement, the water faucet at Baturraden Green School uses a traditional bamboo faucet known as Padhasan. Padhasan is made of large bamboo approximately 4 meters long, used for the water flow, and given four holes with a distance of 1 meter among each hole. The Padhasan spot is closed using a rubber stopper.

Padhasan is one of the traditional Javanese equipment commonly used for bathing, wudhu (ablution), or washing. Padhasan at Sekolah Alam Baturraden is also used as a learning medium for students, as they experiment on the nature of water. The students could understand that the flow of water has pressure, water flows from high to low, and the heart of the water that forms will follow the container.

3. Open Class, Morning Promise, and Morning Activity
The next activity after Dhuha prayer is Open Class, Morning Promise, and Morning Activity. This activity starts at 08.30 every day. This activity begins with gathering with others, pehearting joint prayer before starting learning activities, and stating a commitment to school rules. Aperception activities are done in the classroom. Saung, which has bamboo walls, wooden mats, and a roof using a series of leaves of reeds or fibers, is where the students learn. The teacher engages in aperception activities with light conversations and presents real media according to the day's learning theme.

The next activity is the morning activity. The morning activity starts at 09.00. The morning activities for Play Group and Kindergarten students contain exercises that are oriented on academic readiness, namely readiness to write, to read, and to count. They enter the classroom to do active learning through storytelling, roleplaying, discussion, and some light academic works such as coloring, drawing, and interactive worksheets. Students and Teachers per exercises motor moves outside the classroom through fun thematic physical activity, singing some songs, and drama rhythms.

4. Break and Snack Time
The next activity is a break and snack time. The student on duty to be the day's assistant helps the teacher prepare the food and drinks and the utensils to be used. After the meal, all the children will clean up the garbage and wash the dishes. When clearing the food, the child will separate organic waste with non-organic waste and throw it in a separate large bin that is available in the school.

The lessons of a loving and caring environment are taught at Baturraden Green School through daily habituation, including in sharing meals. The snack menu every day is always various. However, on Thursday, especially, Banyumas traditional food or meal is presented.

Snack menu, which is always served in turns, are Klepon, Jenang, Gethuk, Grontol, Plered, Puli, Escaped, Lopis, and Mendoan. Keep on is a small ball-shaped snack, made from rice flour and sticky rice flour with the natural food coloring by the extract of pandan leaves, filled with Java sug feed and sprinkled with grated coconut. Jenang is a light snack made from sugary dough mixture cooked to thick and sprinkled with sesame seeds. Gethuk is made from cassava boiled and crushed together with sugar and grated coconut, then fried in small pieces. Grontol is young grated corn that is cooked and garnished with sugar and then sprinkled with grated coconut. Plered is made from tapioca flour. Puli is made from cassava, which is then given a natural black dye from the burned rice (rice tree), both served together with sugar and grated coconut. Lopis is made from glutinous rice flour cooked flour, added by coconut milk and wrapped in banana leaves. Lopis is made from steamed glutinous rice.
Mendoan is a tempe coated in rice flour dough and flour with grinded spices, then fried medium cooked.

5. The Core of Integrated Thematic Activities

The subsequent activities after the break are core activities called integrated thematic activities. Experimental methods and experimental methods carry out integrated thematic activities. There are several learning themes at Baturraden Green School. Some particular pieces that raise local wisdom in Baturraden Green School are the theme of plants, animals, Banyumasan culture, the surrounding community, and natural phenomena.

The first applied learning theme at Baturraden Green School is the theme of Plants. Early concepts about the differences of plants are taught, as articles various varieties of plants in Baturraden. Learning on the plants' theme is done through an experimental method, where the child is doing profound observations in the neighborhood around the school. Children observe by seeing, watching, touching, holding, touching, smelling, and feeling the various shapes, colors, textures, and parts of every plant or plant they codpiece.

Learning on plants' theme is also done through experimental methods, for example, in the replanting resin or pine seedlings. The children use resin seeds and pine seeds, replanting in new poly bags or used poly bags that can still be used. When the resin and Pine seedlings that they plant and they care for reach a specific size, they will submit the plant to the local government who takes care of the forest (PERHUTANII Indonesian state forestry company). The exploration method is done by Mediated Learning Experiences, where the students are taken to the source of learning. One of the places is Baturraden Botanical Garden as one of the tourist destinations. It has various varieties of Baturraden flora varieties.

Children are drawn to the source of learning and taken to the source of learning directly to be closer so that children can explore in detail and depth. In plants' theme, the school presents the Guest Teacher, such as the resin gum resin farmer. Children are welcome to question the Guest Teacher about the resin gum resin profession and how to tape the resin start, and the benefits obtained from the resin gum.

Methods of exploration and experimentation were also carried out in animal themes. The children explore the neighborhood around the school to find various animals; they identify the name of the animal, its characteristics, and the animal's way of life. In the exploration, the students will find the animals inhabitants in Baturraden. If they are lucky, they can find and observe the wildlife investigation such as Lutung, Rabbit, and the Eagle.

Early childhood at Baturraden School of Nature also learns about the communities in which they live. The students at elementary school learn about the broader life of the community organization such as Sub-district or Regency while the students in early childhood learn about the village's scope. The child will visit the nearest village in Baturraden. They could learn about anything related to the village, the leader in the town, and characterize the village in the area of Baturraden.

On a particular theme, children will learn about Banyumasan's culture and traditions, namely Sepitan and Mbaranggawe. Mbaranggawe is a Holetown or party performed by a family over marriage and owned in the mbaranggawe Sepitan practice, which istownanksgiving performed by a family when their son is circumcised. In Mbaranggawe or Sepitan, there are habits and procedures performed, which have a very thick cultural philosophy of Javanese Banyumasan. The children learn the customs and culture of Banyumasan local wisdom.
through experimental methods. The students sometimes visit one of the events mbaranggawe or septian.

Children are also introduced to their distinct conducted, Ngupati, and Mitoni tradition. Ngupati is a tradition of being thankful for the age of a mother’s womb for her four months old preknown and Mitoni is a thanksgiving during the pregnancy of 7 months. According to Islam, four months of pregnancy is the age where the soul is blown to the fetus. The age of 7 months is the age at which the fetus' organs are complete. Thus it requires environmental support to grow strong and healthy. Learning uses the roleplaying method. One of the facilitators plays a pregnant mother's role and does some procession in ngupati and mitoni.

Mount Slamet is a period volcano. Baturraden Green School is located at the foot of Mount Slamet. When the mountain Slamet is active, the students could feel various warning signs of a natural volcano surrounding the school. In the theme of natural phenomena, children are taught about erupting volcanoes through experiments using artificial volcanoes (made from newspaper or clay) with some miniature trees and houses under the mountain. The central part of the ‘mountain’ is hollowed, and then red dye and baking soda are added to produce effects such as eruptions and lava discharges.

Children also learn about mountain environments' characteristics through experimental methods to observe and feel each day, for example, through the scenery and air temperature. Children also learn about mountain eruption through documentary films. By the time the Slamet volcano showed its activity, the ash rains and the boom of Slamet mountain were positively perceived phenomena at the school site. When the situation is still safe, students are not off and study at school as usual. In this particular condition, the children could learn about the natural phenomenon through the actual situation.

At the theme of natural phenomena, children also learn through the roleplaying method. Roleplaying done is the simulation to face natural disasters such as volcano eruption. The children played the role of themselves in school and likened it to the Slamet mountain shows its activity. The children perform the rescue process along with all the school facilitators.

RESULTS AND DISCUSSION

Instilling the local wisdom in Baturraden Green School is applied through various themes, especially five indigenous themes: Plants, Animals, Banyumasan Culture, Surrounding Communities, and Natural Phenomena. The various activities in each theme are conducted through a scientific approach. According to Mulyasa (2013), a scientific method is an approach that triggers and provides flexibility for students to think scientifically through active participation in 5 essential components of observing, questioning, multiplying, experimenting piece implementation through communicating, interacting, and cooperating method.

Observing, questioning, associating, experimenting, and implementing are applied in Baturraden Green School every day through creative and innovative active learning. The nation's cultural values, which are increasingly eroded, are introduced and reattached through scientific approaches such as roleplaying activities, experiments, explorations, and inquiries in discussion activities. In these activities, the children are invited to experience directly and think scientifically about the various phenomena found in the environment.

Bell et al. (2009) said that to build knowledge in children needs an opportunity for individuals to interact freely with the world around them both physically and socially. Children need a
concrete physical object that exists around them and direct experience in social activities through meaningful interaction and communication.

Piaget (1927) mentioned that children should be given the freedom to research directly through their surroundings. Through try and researching, children will be able to find their knowledge and skill. This was one of the foundations why the scientific approach in the early childhood learning process was necessary.

The scientific approach brought freedom to children for doing observations. Observing was conducted by optimizing all senses like seeing things directly, listening to voices, savoring, detecting various kinds of smells, touching, pressing, squeezing, tasting different textures of stuff surrounding them.

Here is a summary of indicators of the scientific approach taken at Baturraden Green School:

<table>
<thead>
<tr>
<th>THEME</th>
<th>INDIGENOUS ACTIVITY</th>
<th>SCIENTIFIC APPROACH INDICATORS</th>
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</thead>
<tbody>
<tr>
<td>Welcoming by Kenthogon</td>
<td>Children seemed excited and enthusiastic when arriving at school.</td>
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<tr>
<td>Welcoming by Wayang Orang</td>
<td>Children are motivated to find out more about Indonesian culture and art.</td>
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<tr>
<td>Taking 'Wudhu' (ablution)</td>
<td>Children recognize the function of &quot;padhasan.&quot;</td>
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<td>through &quot;padhasan&quot;</td>
<td>Children understand the nature of water.</td>
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<td></td>
<td>Children are capable of implementing knowledge of the nature of water through a &quot;padhasan.&quot;</td>
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<tr>
<td>Plants</td>
<td>Exploration of plants around the school</td>
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<td></td>
<td>Understand the differences between trees and plants</td>
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<td></td>
<td>Classify trees and plants</td>
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<td></td>
<td>Understand the benefits of plants for life</td>
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<td></td>
<td>Exploration of Nepenthes</td>
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<td>Understand the characteristics of Nepenthes</td>
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<td>Understand the parts of Nepenthes</td>
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<td>Understand the function of Nepenthes</td>
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<td>Plants</td>
<td>Exploration of Resin Trees and Pine Trees</td>
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<td></td>
<td>Understand the difference between Resin &amp; Pine Seeds</td>
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<td>Understand the function of the Resin &amp; Pine Trees</td>
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<td></td>
<td>Able to plant Resin and Pine seeds</td>
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<tr>
<td>Animals</td>
<td>Exploration of animals around the school</td>
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<td></td>
<td>Understand the varieties of animals in Baturraden</td>
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<td>Typical Wildlife (animals)</td>
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<td></td>
<td>Understand the characteristics of various animals</td>
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<td>Banyumasan Culture</td>
<td>Exploration of Mbaranggawe</td>
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<td></td>
<td>Understand the characteristics of Mbaranggawe</td>
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<td></td>
<td>Exploration of Sepitan</td>
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<td>Understand the characteristics of Sepitan</td>
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<td>Exploration of Ngupati &amp; Mitoni tradition</td>
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<td>Understand the purposes of Mbaranggawe</td>
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<td>Understand the characteristics of Ngupati &amp; Mitoni tradition</td>
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<td>Understand the purpose of Ngupati &amp; Mitoni</td>
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Active learning occurs at the Baturraden School of Nature through meaningful and joyful activities, utilizing the natural surroundings as the primary learning medium. Education is not just oriented to stationery only. Learning is creatively and innovatively packaged so that children feel and enjoy challenging and fun activities. Students seem active and enthusiastic in every learning activity. No children appear sluggish or even reject to school.

More and Cosco (2007) said education teaching children through the constrained obEducationsily available in the surrounding environment prove to be useful in making children more motivated, luring them to explore curiously. Therefore, it could transform the passive students into active ones (More and Cosco, 2007). This was added by Skinner & Pitzer (2012) that child involvement in meaningful learning activities in the neighborhood would much support the rise of psychological well-being. The surroundings (nature) store so much knowledge, which must be studied in-depth, so that children learn about the collection of knowledge in the form of facts, concepts, or principles only, but the child can make an active discovery process.

CONCLUSION
Internalization of local wisdom through the Indigenous Scientific Approach at Baturraden Green School is implemented through active learning activities. Students are given the experience to explore and interact with the surrounding environment. They are also given vast opportunities to initiate and to find their knowledge through experiments. Children are introduced to Banyumasan's local food, art, and traditions through habituation and hands-on experience through roleplaying. The indigenous scientific approach applied in Baturraden Green School makes the students enthusiastic and motivated and helps instill the value of local wisdom of the nation's culture.

REFERENCES