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Developing Students Science Literacy in Adiwiyata School: Case Study in Padang City, Indonesia

Safrizal Safrizal[1], Sudarmono[2], Resti Yulia[3]

[1]*Fakultas Tarbiyah dan Ilmu Keguruan, Universitas Islam Negeri Mahmud Yunus Batusangkar, Indonesia, safrizal@iainbatusangkar.ac.id, ORCID ID: 0000-0001-8293-586X*
[2]*Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Teknologi Bandung, Indonesia, ORCID ID: 0000-0002-6484-1955*
[3]*Fakultas Tarbiyah dan Ilmu Keguruan, Universitas Islam Negeri Mahmud Yunus Batusangkar, Indonesia, ORCID ID: 0000-0002-7089-587X*

ABSTRACT

This research aimed to describe the development of scientific literacy of students in Indonesia at the Adiwiyata school. The design of this research was qualitative. The data were gathered through observation, an interview and documentation. The subjects were selected through snowball sampling. Data analysis was carried out by referring to the analytical model proposed by Miles and Huberman with the steps of reducing data, displaying data, and drawing conclusions. The results of the study indicate that the development of scientific literacy in Adiwiyata schools, as described, is carried out by involving various aspects, both the use of facilities and infrastructure as learning media, the academic culture of the Adiwiyata schools being socialized, the use of open-ended questions by teachers in answering questions to stimulate students to find answers with steps scientific knowledge, as well as the determination of rewards and punishments that are carried out consistently for children who are disciplined in following and implementing the school's academic culture and vice versa. The methods used have the same goal, namely, to train students to develop basic science skills starting from investigation, hypothesis testing, to obtaining conclusions based on the data found, so that students' scientific literacy appears.

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Introduction

Scientific literacy is needed for society to face the changes that occur in the era of globalization. The simple concept of science literacy refers to the basic knowledge which citizens or students should have about Science (Foster & Shiel-Rolle, 2011; Frydenberg & Andone, 2011; Holbrook & Rannikmae, 2009a). It enables an individual to make informed decisions about personal, civil, and economic matters. The Organization for Economic Cooperation and Development (OECD) defines Science Literacy as "Capacity to use the knowledge, to identify the question, and to create a conclusion based on the evidence to understand and help in deciding the nature of the world and the changing which is made for the science from human activity" (Dani, 2009; DeBoer, 2000; Holbrook & Rannikmae, 2009a; Laius & Rannikmae, 2014; Milne, 2004). Science Literacy develops the capability to

be creative in utilizing science in daily activity or in career. Science literacy may accordingly increase the quality of life (DeBoer, 2000; Dragoş & Mih, 2015; Norris & Phillips, 2003; Sülün et al., 2009).

Developing a Science Literacy society has several impacts. It is considered as a crucial strategy to develop the mindset and behavior of students and build human character to care, be responsible for themselves, society, the universe, and the problems faced by modern society today. Science and technology are associated with high-profile public issues such as climate change, pollution, and energy generation. As the global economy grows and becomes more integrated, it creates a greater need for science literacy (Sinaga et al., 2017; Upahi et al., 2017). Science literacy is accordingly increasingly viewed as a goal that should be pursued by the school system, especially at primary school level. This is because science is one of the fields of study that play an important role in generating and form students who have critical, logical, creative thinking skills, innovative and globally competitive. Science learning is also expected become the main foundation of education as a vehicle for students to know more about science contextually and implement in everyday life.

This will require a transformation of the national school system from primary schooling up. Adiwiyata School in Indonesia operates a school programme that focuses in part on the acquisition of science literacy. This study aimed to investigate Adiwiyata school as one that focuses on developing a culture of environmental care through the development of scientific literacy.

Adiwiyata School

Adiwiyata in Bahasa Indonesia alludes to a good place where knowledge can be obtained alongside norms and ethics in relation to the ideals of sustainable development (Kementerian Lingkungan Hidup, 2011). Adiwiyata School is a place of learning where the environment provides the basis for the curriculum. Linking each lesson to the context of the environment is one of the criteria that must be met in schools that are designated Adiwiyata (Kementerian Lingkungan Hidup, 2011). The Adiwiyata program focused on the achievement of basic competency standards for primary and secondary education. It also emphasises the efficient use of school operational funds through reducing the consumption of resources and energy. Adiwiyata school operate as environmentally friendly schools. The aim of the programme is to provide experiences for students to develop an environmental culture and cultivate a clean environment as a fit place to live. Adiwiyata schools involve students in the introduction of measures to preserve the natural environment and make the school a shining example. The school carries out a recycling program that includes making compost from organic waste, and planting and using natural plants to prepare traditional medicine. The school brings in experts to broaden students' insights related to clean and healthy living habits. This aspect of the curriculum is the one that develops students' scientific literacy. slogans and posters depict themes from science and social science relating to healthy living habits.

Science Literacy

Science literacy is defined as the understanding and application of science in everyday life. This understanding is defined based on some expert opinion that scientific literacy is the capacity to use scientific knowledge, identify questions to draw conclusions based on evidence to understand, and help make decisions about the natural world and human interactions with nature You have already spoken about the nature of scientific literacy earlier on. Merge them so that you do not merely repeat yourself (Foster & Shiel-Rolle, 2011; Holbrook & Rannikmae, 2009a). scientific literacy can be interpreted as the application of scientific values that are reflected in daily activities that apply science to problem-solving. The concept of scientific literacy includes scientific process skills needed by learners to study the world of science and technology in detail with a view to a systematic understanding of the environment. (Hodosyová et al., 2015; Norris & Phillips, 2003; Sülün et al., 2009; Turiman et al., 2012).

Based on a description of the advantages of Adiwiyata schools and the importance of scientific literacy for elementary school students, this research question is directed at how to develop

scientific literacy of elementary school students in Adiwiyata schools. This question is stated with the aim of publicly describing the steps or strategies taken by school personnel in developing scientific literacy of elementary school students. Thus, this research finds updates to provide information to readers related to the Adiwiyata program and the development of students' scientific literacy in it.

Methods

The qualitative descriptive research approach was used. The informants for this research consisted of principals, vice principal for curriculum, 12 teachers who teach at an Adiwiyata school from grade 1st to 6th, and a Adiwiyata Program Development Team at school selected by the Snowball Sampling technique (Creswell, 2013; Miles & Huberman, 1994; Sugiyono, 2018), informant based on information which the researcher has collected from other informants. Tools used were a interview guidelines, student and school activity observation sheet, and mobile phones to record and document events that happened during the study. Observations were carried out in a participatory manner, various documents and posters related to the Adiwiyata program in schools. research instruments that have been described, can be seen in the following table.

Table 1

List of Interview Questions

No	Interview Question
1	What underlies the school or school components in making SDN 03 Alai an Adiwiyata School that cares about the environment and makes science the basis for learning in this school?
2	How do teachers use the environment as learning that instills the character of young scientists in learning?
3	How do you teach students in the application of science learning to students for situations according to the problems in their environment?
4	What is the teacher's strategy in developing students' literate attitudes towards science as problem solving in everyday life?
5	What steps do teachers take in developing students' abilities to use environmental education as an approach in answering questions about everyday problems regarding the environment?

Table 2

Observation Guidelines

No	Point of Observation
1	Activities of school personnel in carrying out student scientific literacy development activities (learning process, Adiwiyata school project, and composting)
2	A school environment that supports the development of students' scientific literacy at adiwiyata school
3	Student activities during the learning process at school
4	The use of the environment as a medium for learning science for students
5	School program to develop students' scientific literacy

Table 3

Research Documentation Study

| No	Point of Dokumentasi
1	Learning Tools/Teacher's Lesson Plan
2	Posters and pictures in the Adiwiyata environment
3	Learning support facilities and facilities

The research results are analyzed using the Miles and Huberman model which consists of sorting research data by grouping them into coding into a theme, displaying research findings in the results, and drawing conclusions based on research data that has been collected and sorted. (Kawulich, 2004; Miles & Huberman, 1994). To ensure the validity of the data obtained in the study, the research used triangulation techniques and extended observations, (Creswell, 2013; Miles & Huberman, 1994).

Findings

Based on the data that has been collected, the data reduction and analysis process is carried out by sorting and grouping based on the research theme, so that the results shown in Figure 1.

Figure 1

Results of Triangulation of Research Data
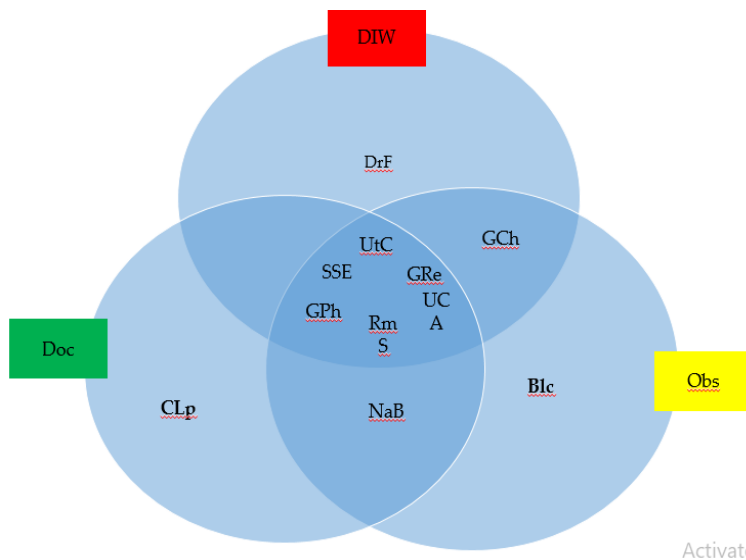
Note: (1) Obs is Observation; (2) DIW is Depth Interview; (3) Doc is Documentation; (4) DrF is Drawing Figure; (5) NaB is Note in Book; (6) GcH is Giving Charge; (7) Blc is Blacklist from present; (8) UtC is Utilize the Fasilities; (9) IAC is Introducing Academic Culture; (10) GPh is Giving Punishment; (11) Gre is Giving rewards (12) Rms is Reminds Life and Healthy Program; (13) CLp is Call for Paper

This picture presents the results of triangulation of research data on how Adiwiyata schools develop students' scientific literacy. The picture above shows that there are six efforts made by teachers at Adiwiyata schools in developing students' scientific literacy, including:

Utilizing Adiwiyata Supporting Facilities and Infrastructure as a Learning Media

Adiwiyata School teachers are expected to utilize the school environment and the posters which exist in the school. The aim of it is to create the students' science literacy in building

comprehensive to guide the students to implement the attitude in their daily life. The activity of utilizing the environment which is implemented by the teacher in Adiwiyata School is purposed to introduce the students as a basic knowledge of the students. Everything in the classroom, including the gesture, the letter, which is shared, and the lesson plan send a message about learning. It means all the principles which exist around the students are the learning component which should utilise to avoid the risk of the big unbeneficial. This finding is based on the results of interviews conducted by teachers who stated that the supporting facilities and infrasutructure in adiwiyata schools was filled with slogans and pamphlets about the application of science and basic science as learning media.

> "*In explaining learning, the teacher uses slogans, pictures, and pamphlets on the school walls for learning. Generally, every class in this school uses this image for the learning process, so that the learning message can be conveyed properly for students*" (DIW 14)

> "*Slogans on school walls, such as pictures that, were used as appeals, invitations, and notifications. Both about cleanliness, about the environment and how to care for it, about the metamorphosis of animals. This is intentionally made for learning*" (DIW 21)

The findings above are in line with the results of observations regarding the use of supporting facilities and infrastructure for adiwiyata schools used by teachers as teaching materials, such as, that;

> "*Exactly at 09.00 am, the teacher and students together exited the classroom and headed to a wall that had a picture of the metamorphosis of a butterfly. Students seem enthusiastic and pay attention to the teacher's explanation and record the observations based on the picture. The activity was continued with observations in the flower garden at the school, students were seen observing the leaves and seeing how the butterflies took honey from the flowers*" (Obs 20).

> "*In the school field, to be precise in the greenhouse area. The researcher saw students gather and bring books to record the names of plants, and observe the shape of the leaves of each plant in the school*" (Obs 10)

The statement above is also supported by the results of the documentation related to the learning carried out by the teacher using the Adiwiyata school supporting facilities and infrastructure for the learning process, this can be seen in the following figure.

Figure 2

Teacher Explains the Name of the Plant and the Shape of the Leaf [a]; Students Observe the Shape of the Leaves [b]

[a]   [b]

The use of supporting facilities and facilities at Adiwiyata schools is used to strengthen and deepen learning materials, as shown in Figures 2.a and 2.b. The teacher delivers contextual learning about leaf bone structure, through the Adiwiyata school facility, then the next process students make observations of various leaf shapes and group them based on the leaf bone structure that has been explained by the teacher. The deepening of the material presented by students is devoted to the

problem of leaf shape and structure in plants, so that by utilizing the supporting facilities at the Adiwiyata school, students can analyze and classify leaf types based on the leaf bone structure. This activity is a hallmark for teachers at Adiwiyata schools in developing students' scientific literacy.

Academic Culture of Adiwiyata School

Adiwiyata school's academic culture is a specialty that researchers have found in developing students' scientific literacy behavior. One of the academic cultures that researchers found was that the introduction of the school environment for new students was an interesting finding. the introduction of academic culture is carried out to provide understanding related to rules, programs, learning activities, and learning practicums. For example, when researchers conducted observations at school, it was found that the grade 1st teacher was taking students around the school environment to introduce various facilities and infrastructure, including various supporting facilities such as greenhouses, dokomposers, waste banks, live pharmacies, which can be used in learning activities, and the use of first aid if a student is found to be injured. Other academic cultures were also found when carrying out the morning routine, the principal gave directions and appeals about clean and healthy living behavior and the urgency of healthy living for humans. This finding is clearly stated in the following interview results.

> ” This school has a different academic culture compared to other regular schools. learning activities outside the classroom, introduction to the school environment, learning activities take place contextually from the use of facilities and facilities to an academic culture that must be carried out by teachers. that way, students will have a more open insight.”(DIW's Data 28)

The above findings are also supported by the results of observations that researchers made during morning ceremony, which is carried out regularly.

> “Learning process in this school is a little different, we have an academic culture that focuses on deepening material through the natural environment, especially on learning science. so, students not only understand the concept, but they can apply it in solving everyday problems. For example, a few days ago, there was a child who fell, spontaneously, the students immediately gave first aid by using plants that have the same function as antibiotics in the school life pharmacy.” (DIW's Data 29)
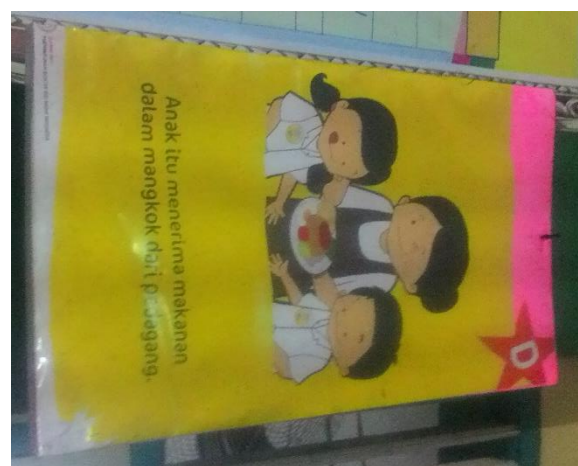
Findings about academic culture policies at Adiwiyata schools can also be found from several posters pasted on every corner of the school wall.

Figure 3

Special Rules at Adiwiyata School [a]; *Posters for Choosing Healthy Food* [b]
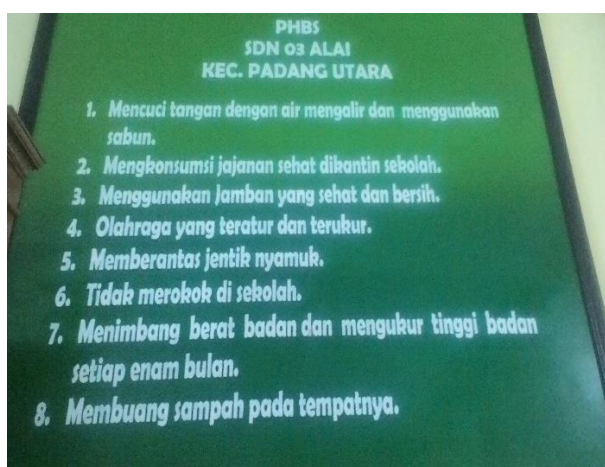
[a]   [b]

Figures 3.a and 3.b present some of the academic cultures and rules that are unique to Adiwiyata schools compared to other schools. This can be seen in the poster in the image that can be described, such as the habit of washing hands, throwing garbage in its place, as well as healthy living behavior which is reflected in neatness, cleanliness, and healthy food selection which is an obligation for every student in consuming it.

Giving Rewards and Punishment

Further research findings that are often found by researchers when conducting research are rewards and punishments. Rewards are given to students who are disciplined in implementing the programs or regulations set at school, while punishment is given to students who violate the rules, regulations, and norms that apply at Adiwiyata schools. the results of an interview by one of the teachers related to the purpose of setting rewards and punishment policies in schools.

> *"Reward as a method to train students' scientific literacy continues to grow. such as giving gifts, or praise to the class and students who no longer litter, this school has succeeded in developing science-based habitual behavior for problem solving, which is clearly visible in daily activities at school."* (DIW's Data 23)

> *"In this school, reward is a method used by teachers in developing behaviors that apply the basics of science in life, such as throwing garbage in its place and the consequences of littering. Children love gifts and will make it better for them to do the activity."* (DIW's Data 24)

Reward is one of the things that researchers often find during the morning ceremony before entering class. This is summarized in the field notes (Obs 4 & Obs 36).

> *"During the morning ceremony, the researcher saw the headmaster of the school giving directions and information related to a clean environment. The principal provided information that an assessment of the cleanliness of the classroom would be held. The class that succeeds in getting the very clean category will get special rewards from the headmaster"* (Obs Data 4)

> *"After doing the morning routine, the principal and teacher gave awards to students who had lined up neatly, disposed of trash in its place, and kept the classroom clean."* (Obs Data 36)

In addition to rewards, punishment is also something that researchers often find during research. The provision of punishment carried out by school personnel aims to provide a deterrent effect, so that students do not repeat the same mistakes. the principle of punishment given is educational for students and has a good impact on schools and students. The following are some of the results of interviews with school personnel related to the implementation of punishment as a follow-up to the evaluation of student activities.

> *"While in the field, the researcher saw some students cleaning and pulling grass around the school area accompanied by a teacher. This grass-pulling activity is carried out as a form of punishment because students are late to school or violate the rules that have been set at school. one of the teachers said, "this activity is only for learning so that students are disciplined"(Obs data)*

The findings from the observations above are supported by the results of interviews with teachers, that.

> *"In this school, if you are late for school or if you throw garbage out of place, then the punishment is to revoke the grass and sort, pick up the garbage around the school"* (DIW 21)

Evidence of the punishment applied by the Adiwiyata school, can be seen in the following picture.

Figure 4

Students Sort Trash as A Form of Punishment for Being Late for Class

Clean and Healthy Living Behaviour and Save Energy Program

Students are always reminded about maintaining a clean environment, living clean with healthy food, and choosing foods that are suitable for consumption by the body. This is often found by researchers in many activities and activities that take place in schools. This finding is evidenced by the following observations.

> "*In every morning activity, the teacher always asks problems. usually always use interrogative sentences such as how, what, why. This is done to explore students' understanding of the knowledge and implementation of school academic culture regarding the application of science in life, such as choosing healthy food, maintaining cleanliness, saving energy and others at Adiwiyata schools.* (Obs 12)

The same thing was also found in the results of an interview from one of the teachers related to the efforts made to depeloving scientific literacy that the process of repetition and reminding students is often carried out both inside and outside the classroom, starting from environmental cleanliness, throwing garbage, also saving energy. As one teacher said during the interview,

> "*Usually, the teacher always reminds students to always choose good food to enjoy, turn off the lights during the day to save energy, and clean the surrounding environment. This program is carried out with the aim of accustoming children to always maintain a pattern of life. In addition, this program is always engrossed in science materials, so that based on problems resulting from not maintaining a lifestyle, children are taught to observe the causes and preventive actions of diseases caused when maintaining a healthy lifestyle, as well as energy saving issues, this program is a topic in subject topics that are used as material for children to observe, based on the conclusions of findings and scientific steps. At this school, the program is consistently carried out and established, because it is a differentiator from other schools, and we do this continuously by repeating and reminding students.*" (DIW's Data 21)

The findings above are supported by observational evidence about teacher activities in reminding and repeating information about the importance of understanding science in solving problems, which were carried out when students were about to enter class and after the morning ceremony.

> "*At 10.00 am, the recess bell rang, the researcher heard one of the teachers reminding students to wash their hands before eating, to keep the environment clean. At the same time reminding the class picket officer and the person in charge of the picket formed by the teacher to help monitor and supervise other students and record the names of those who litter.*" (Obs Data 22)

Documentation of student activities in implementing a healthy lifestyle carried out by pulling weeds around the school environment can be seen in Figure 5.

Figure 5

Students are Guided by the Teacher Cleaning the Surrounding Environment

Repetition is a way for the teacher at Adiwiyata School to create an attitude so that the students always remember and habitual to do activities that are appropriate with science literacy or closer to the vision and mission as an Adiwiyata school which has known responsive and the culture of the environment. People agree that teacher has an important role in succeeding the learning at school. The principle is repetition will appear the ability to remember for the students. Next, they applied what they have remembered. Similarly, the concept is the same as in quantum teaching, it is stated that repetition strengthens the nerve connection and rise the feeling of I know that I know about this. That statement can be interpreted that repetition which is given by the teacher gives an impression with the term memory to do or not the attitude which is suggested. It is suitable with the writers finding that repetition which is done by the teacher about the information or announcement has a function as a reminder or alarm for the students. It is expected they are always on the right track, in this case, it is based on the science literacy attitude.

Problem-Solving by Asking Open-ended Questions

The last finding that researchers often see in developing scientific literacy behavior is problem solving with open-ended questions. This question will provoke inquiry for students in solving problems they encounter regarding cases related to science. as the result of an interview from one of the teachers.

> "*Sometimes teachers often intentionally throw garbage in the field, this is to challenge whether students already have an awareness of the negative impact through this question, to get an idea of his ability, here the teacher always asks students the reason for the problems found, based on these questions, the teacher directs students to conduct an investigation about the negative impact of the case made by the teacher, then interpret the importance of disposing of waste in its place by using facilities such as science posters on the school wall, and seeking other information from source books in the school library.´*(DIW's Data 16)

The above results are supported by the observation findings (Obs Data 12 and 16).

> "*After the morning activity, the researcher sat in front of the 1st grade room, a voice from inside the teacher's discussion class asked why the lights were still on during the day. Is this how we save energy? what if we turn off the lights? Simultaneously the students answered in agreement and instantly the lights in the classroom went out. From these questions, students begin to be guided to conduct investigations, observations and so on.*" (Obs Data 12)

"In every morning activity, the teacher always asks about problems. usually always using interrogative sentences like how, what, why. This is done to explore students 'understanding of students' scientific literacy behavior in Adiwiyata schools, then students always solve problems from questions given to them by the teacher" (Obs Data 16)

The statement of observation results is strengthened by the findings of data generated from interviews related to the teacher's efforts in develop scientific literacy on the topic of using open ended question as a form that has been found, one interviewee said that

"One of the teachers said, when the lights are still on during the day, to come up with their ideas and train them, we usually just ask about what time it is, why the lights are still on, and what they should do if the lights are still on during the day. From these questions, students practice solving problems by observing, asking questions, and finding answers based on the results of investigations related to the topics and situations asked by the teacher, so that students are trained to solve problems based on scientific steps." (DIW's Data 21)

Supporting data about problem-solving through open-ended questions can be seen in the activities carried out by grade 3 students who observe and seek information from sources based on problems or learning topics presented by the teacher in class, as shown in Figure 6.

Figure 6

3rd Grade Students' Investigation Activities from the Results of the Teacher's Questions about Learning Topics in Class

Based on the evidence of findings related to the development of student scientific literacy in Adiwiyata schools carried out by using open-ended questions for problem solving, it can be concluded that these activities are carried out to support students in developing analytical and problem-solving skills based on relevant theories, by utilizing existing media and reference sources, so that students' insight into problem solving is trained, especially on science concepts in problem solving that students find in everyday life.

Discussion

The development of scientific literacy in Adiwiyata schools, as described, is carried out by involving various aspects, both the use of facilities and infrastructure as learning media, the academic culture of the Adiwiyata schools being socialized, the use of open-ended questions by teachers in answering questions to stimulate students to find answers with steps scientific knowledge, as well as the determination of rewards and punishments that are carried out consistently for children who are disciplined in following and implementing the school's academic culture and vice versa.

Research findings on the development of scientific literacy of students at Adiwiyata schools are unique which are not found in regular schools in Indonesia. The results of interviews conducted by

teachers and school personnel as well as the findings of the observation 20 show that the development of student scientific literacy is carried out by utilizing supporting facilities and facilities at Adiwiyata schools as learning media. Supporting facilities and facilities found in the form of adiwiyata slogans, pictures and pamphlets that direct the subject matter at school, especially on material related to science. The use of supporting facilities and facilities at adiwiyata schools is carried out by utilizing them in science learning that has a relationship with the material being taught with existing facilities, for example in the findings of good practice research, the use of these supporting facilities and facilities is directed at existing parks and plants to study and observe the various types and shapes of existing leaf bones. The utilization carried out directs students to conduct investigations and observations to analyze, classify, and identify the shape of the leaf bones in each plant in the school flower garden. The learning process by utilizing this adiwiyata supporting facilities and facilities becomes a way for teachers to teach scientists ways to carry out investigations starting with observing, asking questions, and looking for related theories to find definite answers. This activity became one of the findings that in the end the researchers concluded that the use of supporting facilities and facilities at Adiwiyata schools on a regular basis can train students' basic science skills, so that sooner or later the concept is formed that scientific proof has ways and steps that must be taken to find the answer.

Another uniqueness of developing students' scientific literacy at Adiwiyata schools is to develop the school's academic culture which is socialized and introduced to students during the orientation period or the introduction to the school environment. This is in line with the results of interviews 28 and 29 as well as the results of the documentation found by researchers when conducting research. Academic culture in Adiwiyata schools, as the results of interviews that have been conducted, obtained the basic objectives of introducing the school environment, learning methods, supporting facilities and facilities, as well as regulations that students must follow while carrying out education at Adiwiyata schools. Based on the exposure to this data, the researchers found that the purpose of developing a campus academic culture was to explore learning materials related to nature and the environment as presented in the results of the 29th interview, so that students not only understood the concept of science but directed the application of learning content to solve problems. science-related problems in everyday life. The school's academic culture that has been established does not only lead to the rules that must be carried out by students during the learning process, but also leads to the habituation of students to carry out a healthy lifestyle. Based on the data that has been obtained, it can be concluded that the academic culture of the school at Adiwiyata school aims to provide material deepening to students, as well as familiarize students with learning patterns and healthy lifestyles, so that the school's academic culture is set to be able to provide good habits for students in undergoing the process. learning and life.

The third finding related to the development of students' scientific literacy in Adiwiyata schools as found by researchers lies in the consistency of teachers and school personnel in giving rewards and punishments to students. The provision of rewards and punishments is routinely carried out every day when carrying out activities in the morning. This is as the findings collected based on the teacher interviews 23 and 24 and the observations 4 and 36. The rewards and punishments given are directed at matters relating to the application of science in life, as stated in the academic culture. namely disposing of garbage in its place, maintaining personal and environmental hygiene, and choosing healthy food for consumption. The habituation that is carried out is essentially directed at developing student attitudes related to the importance of healthy living in daily life which reflects science as a product and scientific attitude, so that students are trained to have good habits in their lives.

The development of scientific literacy for Adiwiyata school students is also carried out by establishing the habit of clean and healthy living programs. The clean and healthy living program that has been running at the Adiwiyata school, as described above, is carried out with the teacher constantly reminding students to choose snacks that are suitable for consumption by the body, both food and drinks, as well as several other activities such as saving energy and keeping the surrounding environment clean. The repetition and warnings given by the teacher are carried out continuously during school hours, with the aim of this habit being attached to students' memories to keep children

familiar with maintaining a healthy lifestyle both at school and at home. These findings are like the results of the interview 21, and observations 12 and 22. The development of scientific literacy carried out by establishing a healthy and energy-efficient lifestyle program is one way for teachers to provide education on the importance of maintaining a healthy lifestyle, as well as the negative impact of not maintaining a healthy lifestyle. healthy ones. This presentation is supported by the teacher's explanation in a learning topic so that students find answers based on the topics studied regarding the impact of unhealthy food. Completion of this topic provokes students to conduct investigations by observing, reading relevant source books, to obtaining answers from the readings they have done. Thus, students' scientific literacy is formed and accustomed to making scientific steps in solving problems in everyday life.

Support for the program, followed by other ways that the teacher uses problem-solving methods using open-ended questions. These findings are like the results of interviews 16 and 21, as well as the results of observations 12 and 16. Open questions are asked by the teacher to students with the aim of directing students to the problem-solving process by conducting investigations, collecting evidence and data to the stage of drawing conclusions from the results of student investigations of the topic or problem presented by the teacher. Problem solving with open-ended questions as well as the data that has been found also aims to make students trained in answering problems that are solved by scientific steps, so that it can be one way to develop students' basic science skills.

Some of the findings described above, it can be understood that the development of scientific literacy of students at Adiwiyata schools is carried out in various ways, from teachers, school facilities, programs, to an academic culture that has been established and carried out continuously and consistently. These methods are carried out with the same goal, namely developing students' scientific literacy by training, reminding, giving rewards and punishments with the end so that students not only understand the concept of science through the material explained by the teacher, but students also have basic science skills to solve problems. Problems encountered in everyday life. This refers to the results of research (Demirçalı & Selvi, 2022; Dewi et al., 2021; Ilkorucu et al., 2022; Suryana et al., 2021) that habituation, repetition and giving open questions in theory have a good effect and impact in developing students' critical thinking skills, so that students could investigate their findings to find conclusions based on experimental data that has been carried out (Mohapatra, 2013; Nappi Judith, 2017; Norris & Phillips, 2003; Suryana et al., 2021; Yuenyong & Narjaikaew, 2009). Several activities related to the key concepts of science literacy, it was found in the efforts made by the teacher that the introduction of programs and the use of a school environment that was complete with science content was the main target in gaining insight and giving important meaning related to scientific literacy behavior in the future, namely the adequacy competence must-have. The use of the school environment as a means and vehicle for learning as is done by the teacher in the findings above equips students to know more deeply the meaning and concepts of science (DeBoer, 2000; Foster & Shiel-Rolle, 2011; Kasuga et al., 2022; Ülger, 2021). That is, the knowledge that is built is not only at the cognitive level but also at the applicative level. So that the use of the school environment as a learning medium provides student experience in making science projects and makes it a learning experience that will always be remembered and used as a key in preserving the environment through values and aspects of scientific literacy (Hodosyová et al., 2015; Holbrook & Rannikmae, 2009b; Laius & Rannikmae, 2014; Milne, 2004; Wilson, 2007). The findings related to the efforts made by teachers in shaping scientific literacy behavior are unique things that are not found in formal schools without the Adiwiyata program. School personnel is determined that the school provides a comfortable atmosphere for students and makes the school a second home in exploring the knowledge they learn and are taught by teachers. This advantage. It appears in the results of research that has been done that at the level of attitudes and content of scientific literacy, students who learn in the Adiwiyata environment contribute to experiences that state that they have advantages in the application of science learning in solving daily problems.

This research is limited to a description of the ways in which school personnel develop scientific literacy in Adiwiyata schools, so it still requires the development of research topics that explore more

quantitatively, both regarding the influence and the relationship between the two. Thus, further research is highly recommended to examine the relationship between the adiwiyata program or the development steps that have been carried out by the adiwiyata school with the scientific literacy abilities of the students at the adiwiyata school.

Conclusion and Implications

Based on the research findings, it can be concluded that the development of scientific literacy of students at Adiwiyata schools is carried out involving all stakeholders, supporting facilities and infrastructure, which are used as learning materials in science learning. The result of this research gives an implication in the Padang Education Department and others in the scoop of education. It is said that the science literacy in the school which is found in the elementary school students will reach the generation of Indonesia in 2035 if the building of the character is maximalized. The potential which exists this day becomes a bonus for Indonesia in welcoming the gold generation as Indonesia ministry of education and culture stated in his speech at National Education Day. Science literacy which is seen from the students in the Adiwiyata school indirectly supports the school literacy movement which has been planned by the government and has been done in some schools, especially in Padang. It is of course correlate with the Adiwiyata school component which has supported the achievement of students' science literacy.

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