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The Analyse of Concept Understanding of 5th Grade Elementary School Student towards Air in Science Subjects by Using Blended Learning

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Abstract. The aim of this research is to see science concept understanding of 5th grade Elementary School students towards learning material about air through Blended Learning model. This research uses qualitative descriptive method that involved 20 Elementary School students in grade 5 at a school in Sumedang Regency, West Java Province. The data collection was conducted by using instruments in the form of essay test questions to measure the students' science concept understanding towards aspects of factual, conceptual, and metacognitive knowledge that were collected through *google form.* The results show that the students' understanding about air material towards factual aspect enters high category with a percentage of 76.7%, towards conceptual aspect enters middle category with a percentage of 74.1%, and towards metacognitive aspect enters middle category with a percentage of 61.8%. Therefore, it is proved that students' science concept understanding towards air material by using Blended Learning model is good enough. This happened because Blended Learning model can make students capable to follow the learning activity well that is shown by the good learning results and their activeness during learning activity in the class. However, to maximize the implementation of this learning model, the combination between Blended learning with another learning model is needed.

Keywords: Blended Learning, Concept Understanding, Science, Air Material, Elementary School.

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INTRODUCTION ~ Primary Education holds important role in forming children's personality and their mindset (Maghfiroh & Julianto, 2014). Primary Education is expected to be able facilitate students to develop their behaviour, knowledge, and creativity (Sopandi, 2017). In the Elementary School education, the students are given different kinds of knowledge that is going to be foundation to undergo the next level of education. One of main subjects that is taught in Primary Education is Science (Maghfiroh & Julianto, 2014). Science is a branch of knowledge that studies about phenomena and the symptoms occur in nature. Science also can be defined as a knowledge that studies about universe and its content and occurred phenomena in it that are the results of experts' development through series of scientific process conducted carefully (Sujana, 2014).

Through Science, students are able to know the concept and symptom regarding to the nature by sort of method, such as observation, trial, analysis, and etc. The aim of learn about science in Elementary School because science itself is the basic of technology and can improve the students to think objectively. Through Science learning in Curriculum 2013, the students are expected be able to develop their competency in aspects of cognitive, affective, and psychomotor (Deliany, Hidayat, & Nurhayati, 2019). Science learning in Elementary School needs to create meaningful condition, so that the students can understand Science subject fully and meaningful, and also can be

implemented in daily life, such as to solve problem, stake out, and produce a creation (Maghfiroh & Julianto, 2014).

However, in fact that quality of science subject in Indonesia is still relatively low. It is proved from PISA score achievement for science subject, for three times in a row since 2012 to 2018, Indonesia get into the ranking 10 from the bottom. The results of TIMSS study also showed that in 2015, Indonesia occupies rank 45 from 48 countries (Agustin, Pratama, Sopandi, & Rosidah, 2021). Hence, it can be concluded that students' achievement in science subject at Elementary Schools in Indonesia is drop behind (Utama & Kristin, 2020). It also becomes one of proves that Science concept understanding in Elementary School students in Indonesia is still relatively low. Low concept understanding of students can caused by learning process in the class that still uses conventional learning method that is the learning process is still teacher-centered (Yulisa, Hakim, & Lia, 2020). This can make students become less active during learning activity in progress. One of the ways that can be done by the teachers to create student-centered learning is by using appropriate learning model.

One of learning models that student-oriented is Blended Learning model (Rimbawati & Muchlas, 2015). Blended Learning model is a learning model that combines various kinds of source physically and virtually (Subagiyo, 2019). Basic principle from Blended Learning model is learning activity is conducted face-to-face and online where the activity is integrated optimally into unique learning that is already adapted to the learning context and objective (Nugraha, Astawa, & Ardana, 2019). In Blended Learning model, face-to-face and online learning is combined by using various kinds of web-based technology, e-learning technology, and multimedia, such as video, virtual class, online text animation which is combined with traditional learning in the class (Lestari & Siskandar, 2020).

The goal of Blended Learning development is to combine face-to-face learning and online learning to increase students' activeness to create an independent learning (Rimbawati & Muchlas, 2015). This learning model consists of few steps, they are (1) The students look for information, whether it is online or offline, with based on the relevance, validity, and reliability of concept, (2) the students find, understand, and utter their idea or opinion, (3) The students can interpret information they gained from different kinds of source, (4) The students communicate their idea or opinion both online and offline, (5) The students construct knowledge that is the results of analysis, discussion, and drawing conclusion from the information gained both online and offline (Marliana, 2020). To implement Blended Learning model, technology-based media is needed. It is the thing that makes Blended Learning is more interesting, effective, efficient, and can support facilities of learning community (Lestari & Siskandar, 2020).

In line with Blended Learning model implementation, there are few research results related to Blended Learning model, they are proved can increase the students' learning interest and learning outcomes because the delivery of learning material is designed in such way so that

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the students become easier to understand it and learning activity becomes more meaningful (Subagiyo, 2019). The utilization of Blended Learning model is also proved can increase students' concept mastery (Wijayanti, Maharta, & Suana, 2017). This is also in line with research conducted by Hermawan, et al, that stated Blended Learning activity can increase students' concept and reasoning towards physics and also train students to study actively and independently (Hermawanto, S, & Wartono, 2013). Thus, Blended Learning model has been proved can increase the concept understanding of students.

Concept understanding is a condition where the student is already capable to show and explain about learned-materials well either partially or fully by their own language. The students who already understand towards a concept, can explain a material by his own language without stuck on the learning material. Concept understanding can be obtained by the student through learning activity and can be measured through learning outcomes (Alighiri, Drastisianti, & Sulsilaningsih, 2018). Therefore, concept understanding can be a reference in learning activity because it can determine the students' outcomes. Other than that, students' understanding towards a concept that they are learning about will take them to the effective learning to reach learning goals (Deliany et al., 2019).

The measurement of students' concept understanding can be categorized according to the dimension of Bloom Taxonomy (Jeprianto, Ubabuddin, & Herwani, 2021). Bloom Taxonomy is a multi-storey structure which identifies thinking skills from the highest level. The aim of education Bloom Taxonomy point of view is divided into three, they are cognitive realm, affective realm, and psychomotor realm. In 2001, Bloom Taxonomy experienced a change where the formed of cognitive realm is divided into two, cognitive process and cognitive knowledge dimension. In the cognitive knowledge dimension, there are four categories, they are factual, conceptual knowledge, procedural knowledge, and metacognitive knowledge (Effendi, 2017).

Thus, the objective of this research is to measure the science concept understanding of Elementary School students towards factual knowledge, conceptual, and, metacognitive through learning material about air by using Blended Learning model. In this research, the students' Science concept understanding is measured through evaluation question test which inside of it can measure cognitive knowledge skill of the students on the factual knowledge dimension, conceptual, and metacognitive. While the procedural knowledge dimension cannot be measured through evaluation test, because evaluation test in this research do not include a test that demand students to explain technique, method, or logical steps.

METHOD

The research method used in this research is qualitative with descriptive approach.

Place, Subject, and Object of The Research

This research was conducted at an Elementary School in Sumedang Regency, West Java Province. The research subject

is 5th grade students which amounted to 20 students. The research object is students' Science concept understanding towards the knowledge of factual, conceptual, and metacognitive through the learning material about air by using Blended Learning model.

The Data Collection Technique and Research Instrument

The data collection technique about Elementary School students' Science subject concept understanding towards factual knowledge, conceptual, and metacognitive through learning material about air was collected online by using *google form* feature that contains essay test questions regarding to learning material about air. The results of the students' test can be stated in percentage using formula from (Sudijono, 2011) as follows:

$$P = \frac{f}{N} \text{ x } 100\%$$

Keterangan:
P = Percentage Number
f = Frequency
N = Number of Frequencies

The percentage level from each student's test would be accumulated into average score to be categorized by adopting category from (Istikomah & Jana, 2017) and it has been customized with minimum mastery criteria that is already decided to the school where the research was conducted. These categories are presented in Table 1

Table 2 Concept Understanding Category

No.	Score	Category
1.	75 % ≤ score ≤ 100%	High
2.	50% ≤ score <75%	Middle
3.	25% ≤ score < 50%	Low
4.	0% ≤ score < 25%	Very low

RESULTS

The results of the students' evaluation test on factual, conceptual, and metacognitive are explained in **Tabel 2**.

Table 3 The Results of The Students' Evaluation Test

No.	Knowledge	Average (%)	Category
1.	Factual	76.7%	High
2.	Conceptual	74.1%	Middle
3.	Metacognitive	61.8%	Middle

According to the students' evaluation test in **Table 2**, the highest average percentage value is on the factual knowledge, that is 76.7% which means high category. Meanwhile, the smallest average percentage is on the metacognitive knowledge, that is 61.8% which means middle category. For the conceptual knowledge, the average percentage is 74.1% and it falls into middle category.

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Factual knowledge is a knowledge that concerns about terminology, such as meaning or definition. Factual knowledge also concerns about detail and specific element, such as phenomena, location, date, person, and etc, according to the fact (Solihat, Juwaedah, & Rahmawati, 2018). The factual knowledge measurement in this research is the students were asked to explain about the meaning of clean air, where the clean air is, and how the effect of air pollution towards human respiratory health.

Conceptual knowledge is a knowledge that concerns about complex things, such as classification, principle, category, and generalisation (Solihat et al., 2018). To measure the conceptual knowledge, the students were asked to categorize about characteristic features of environmental pollution and link it with surrounding environment. Besides of it, the students also were asked to classify chemical substances that cause air pollution and relate the effect of air pollution towards another pollution, such as pollution of water and soil.

While metacognitive knowledge is a knowledge that concerns about learning and thinking strategy to solve a problem (Solihat et al., 2018). In the metacognitive skill measurement, the students were asked to solve some problems regarding to the air pollution. The students were also asked to give their idea to solve the problem. For the students' answer distribution on each test can be seen in **Figure 1**.

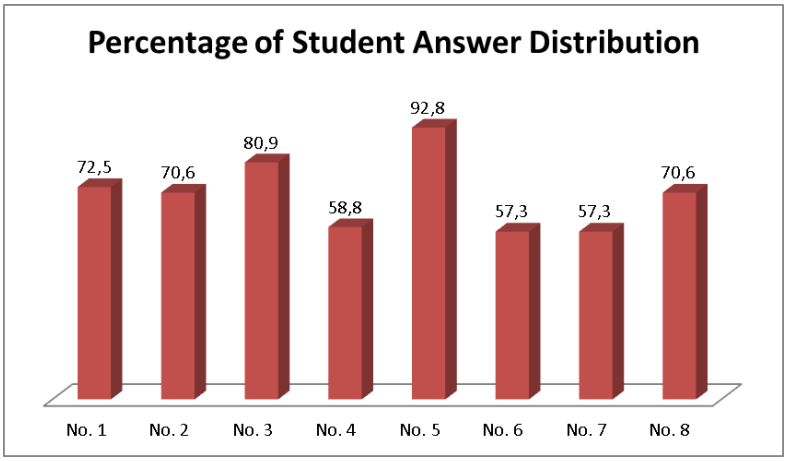

Figure 2. Percentage of Student Answer Distribution

In **Figure 1**, it can be seen that the highest percentage average value is number 5 that is test to measure conceptual knowledge with percentage 92.8%. Meanwhile, the smallest percentage value The students' concept understanding towards science subject can be seen from is 57.3% in the test number 6 and 7 that measure metacognitive knowledge.

DISCUSSION

the learning outcomes. The result of learning is a description of stage of

students' progress in their study in form of score or number that can be benchmarks for the success of a teacher in a learning process. The level of students' concept understanding can be measured through the score that comes from evaluation test (Maghfiroh & Julianto, 2014). The skill measurement of student works to figure out whether the students already achieved mastery learning or not. Other than that, it can also be used to identify the strength and weakness of students that can be references for the improvement of learning quality (Jeprianto et al., 2021).

Based on results of the research in the **Table 2**, it can be seen that the concept understanding of students on factual knowledge by using Blended Learning model falls into high category with average percentage value 76.7%. This can be caused by the students are already capable to explain well about what clean air is and are already capable to explain where the clean air comes from. It can be seen in the **Figure 1** that at essay number 1, the students could answer well as much as 72.5%. Besides of it, most of the students were already capable to explain the effect of air pollution towards human respiratory health and the students could give more than one disease that occur because of air pollution. This can be seen in the essay number 3 that has percentage as much as 80.6%. Therefore, the factual knowledge of students through the implementation of Blended Learning model on science learning is already good and falls into high category.

From the research results in the **Table 2** also can be seen that concept understanding of the students on conceptual knowledge by using Blended Learning model falls into middle category with average percentage as much as 74.1%. This can happen because only half of students who were able to classify about chemical substances that can cause air pollution. It can be proved in **Figure 1**, essay number 4 has low enough percentage, it is 58.8%. Yet, almost the whole students could link the concept of air pollution with concepts from another pollution that can be seen at essay number 5 that has the highest percentage value, it is 92.8%. Other than that, most of the students also were capable to categorize characteristic features of air pollution which is viewed from surrounding environment. It is proved at essay number 2 that has percentage as much as 70.6%. This made concept understanding towards students' conceptual knowledge through Blended Learning model in learning science was already good enough and falls into middle category.

The results of this research is in line with some researches that had been conducted by previous researchers regarding to Blended Learning model. Blended Learning model-based Learning Management System has been proved can increase the students' science concept understanding towards learning material about static electricity (Wijayanti et al., 2017). The research results also are suitable with other researches that state Blended Learning can increase science concept mastery towards physics learning because the learning process is student-centered will make the student concept mastery becomes better (Hermawanto et al., 2013). It has been proved that there is increasement in students' conceptual skill when Blended Learning is implemented through Google

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Classroom (Sirait & Motlan, 2020). This can happen because Blended Learning model can make the whole students are able to follow learning activity well and activeness during learning activity is conducted in the classroom (Purnomo, Ratnawati, & Aristin, 2016).

However, in the **Table 2** is also seen that the students' science concept understanding through Blended Learning still falls into middle category in aspect of metacognitive with the lowest percentage average compared to another knowledge, it is 61.8%. This can happen because only a part of the students who were already able to give idea in solving air pollution problem. It is proved in **Figure 1**, at essay number 8 has percentage value as much as 70.6%. Yet, at the essay number 6 and 7 have the smallest percentage value, it is 57.3%. This is proved that students' critical thinking skill is still need to be increased more. One of the ways to increase the metacognitive knowledge through Blended Learning is by combining the learning model with another learning model.

It has been proved that modification between Blended Learning with Guided Inquiry model is effective to increase critical thinking of the students (Zain & Jumadi, 2018). The research is also in accordance with another research that state Blended Learning model in Guided Inquiry learning model have been proved can increase students' critical thinking (Suana, Istiana, & Maharta, 2019). The students' critical thinking skill also can be improved through the combination of Blended Learning model and Project Based Learning (Candra, Prasetya, & Hartati, 2019).

The implementation of Blended Learning is also effective to use to be utilized at this current moment because it can develop the skills that are needed in this 21th century, they are communication, collaboration, critical thinking, and creativity (Zubaidah, 2016). Blended Learning model is effective to use to support learning achievement if the implementation is already in accordance with the students' learning pattern and the aim of learning (Khoiroh, Munoto, & Anifah, 2017).

Blended Learning has some strengths, they are the students can freely study the learning material independently by using online sources such as google, youtube, and etc. The students also can discuss with another student or teacher easily. The students also can share their files with another student to exchange ideas or opinion (Khoiroh et al., 2017). Other than that, the students can learn independently without teacher's guidance directly that can affect students' curiosity about an information. The learning activity also becomes more flexible and can decrease learning cost (Utari, Hikmawati, & Gaffar, 2020). Meanwhile, the strengths that can be felt by the teacher by using Blended Learning model is teacher can use technology and internet facility to widen materials that are going to be delivered. The teacher also can ask the students to read or doing test when the learning activity either it is not started yet or has been started. The teacher also can easily carry out quiz and use the result for evaluation and give feedback by using technology (Khoiroh et al., 2017).

Blended Learning model also has some weaknesses, they are the media needed

are various, so that makes it difficult to be implemented if the facilities and infrastructures are limited. The facilities owned by the students that are not spread evenly also can be weakness of Blended Learning because when the students do not have computer or internet connection that can support learning, the students are going to feel difficult when Blended Learning is being used (Utari et al., 2020). Besides of it, the weakness that teacher can feel in implementing this learning model is the teacher needs to be able to use technology well, the teacher needs to develop and organize the learning process through online system, and the teacher must have infrastructure that is adequate to support the implementation of this learning model (Katili, Butar-Butar, Agustin, & Marisi, 2018).

Therefore, to optimize and complete those weaknesses in implementing this learning model, it can be combined between Blended Learning with another learning model in order the students can join the learning process well, they can understand the concept more better, and it is expected will produce better learning outcomes.

CONCLUSION

According to the results of this research, science concept understanding of the students through learning material about air on the factual aspect falls into high category with percentage as much as 76.7 %, on the conceptual aspect falls into middle category with percentage as much as 74.1%, and on the metacognitive aspect falls into middle category with percentage as much as 61.8%. This is marked by an evidence where the students were already capable to explain well about what clean air is, where the clean air comes from, capable to explain the impact of air pollution towards human respiratory health, capable to connect about concept from air pollution with other concepts pollution, and capable to categorize characteristic features of air pollution that is viewed from the condition of surrounding environment. Yet, only half of the students who were able to classify about chemical substances that can cause air pollution and only half of the students who were capable to give their ideas or opinion in solving air pollution problem. Therefore, it is proved that science concept understanding of the students on learning material about air by using Blended Learning model was already good enough. However, to optimize the use of Blended Learning model, it can be combined with another learning model.

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