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THE LEVEL OF SELF-REGULATED LEARNING AND SELF-AWARENESS IN SCIENCE LEARNING IN THE COVID-19 PANDEMIC ERA

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ABSTRACT

The study aims to measure/determine the level of self-regulated and self-awareness in the science learning process, analyze students' self-regulated and self-awareness in science learning in the era of the Covid-19 pandemic. The design of this study was a modified experimental pre-test post-test control group design. This research was conducted from March to July 2020, with 200 research subjects divided into four classes. The research instrument consisted of questionnaires and test questions in the online form. The data obtained were analyzed using an analysis of scores and averages of the questionnaire filled out online. The subjects of this study were students who took science classes with a total of 200 students in the Elementary School Teacher Education, Faculty of Education, Universitas PGRI Yogyakarta. The results showed that the learning process of science could take place online using the Zoom application, Google Classroom, UPY e-learning, and WhatsApp group. Based on the analysis results, it is known that the average score of Self-Regulated Learning is 74.59 (good), the average score for Self-Awareness is 75.75 (good), and the average learning achievement is 74.59 (good). It can be concluded that this online science learning takes place to the maximum, has a value of usefulness that is seen from the average of independent learning numbers, self-awareness number, and student achievement, which are in good categories.

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Keywords: self-regulated learning; self-awareness; student achievement; Covid-19

INTRODUCTION

Currently, all countries in the world are busy to save and protect their citizens from the Covid-19 attack. The World Health Organization (WHO) has established the Covid-19 attack as a world pandemic on March 11, 2020. This determination is motivated by the increasing number of victims infected from various countries, including Indonesia. At the time of the establishment of this pandemic in Indonesia, there was a spread of the Covid-19 case that infected several Indonesian citizens who had just returned from traveling abroad. Since President Joko Widodo announced the positive patient for the first time, local transmission has occurred in some parts of Indonesia.

Covid-19 continues to spread to various regions and infects many people, and the local government did not remain silent to prevent this corona virus attack (Ibnu & Setiawan, 2020; Mahy, 2020; Pratama et al., 2020). Various regions continue to take preventive actions to break the chain of the spread of the coronavirus Covid-19.

The first action taken by the Indonesian government is the application of social distancing and physical distancing, namely maintaining a safe distance with all members of the community and family and not traveling and staying at home. This application resulted in many sectors that had to stop their activities, including the education sector temporarily. Educational institutions from primary, middle, and tertiary institutions must lay students, teachers, lecturers, and employees and change the teaching and learning pro-

cess into distance learning. This policy was initially implemented for two weeks and evaluated every weekend. However, after being established and extended twice, this pattern has not reduced the number of positive cases of the Covid-19, let alone break the chain of transmission.

This research is important to do as an effort to adapt learning to the current pandemic conditions and not necessarily when it will end. One form of adapting learning during a pandemic is implementing it online. However, there are still many teachers whose mastery of technology is low so that online learning is not optimal (Anthony, 2019; Martin et al., 2019; Rasmitadila et al., 2020). The still low adaptation of teachers in schools to online learning during this pandemic needs to be anticipated by preparing pre-service teachers who master the technology so that they can continue to carry out science learning activities in elementary schools online. Online learning activities during this pandemic can be carried out in various ways with various existing applications. One level of education that involves many teachers and students is the elementary school level. At this elementary school level, science learning can usually be done directly by observing various natural phenomena in the field (Krist et al., 2019; Falloon, 2019; Radianti et al., 2020). The existence of this pandemic forces science learning to be carried out online which requires the creativity of elementary school teachers to continue to carry out science learning which is not ideal but must still be able to achieve the desired competencies. The existence of a gap between teacher knowledge in the implementation of online science learning with existing teacher activity demands innovation in the implementation of learning or lectures in higher education which will produce future elementary school teacher candidates. Future teacher candidates, including elementary school teachers, must be adaptive to changes such as the current Covid-19 pandemic. Future elementary school teachers must be able to master technology and adapt to the very fast changes in the era of the industrial revolution 4.0 (Alam et al., 2020; Fischer et al., 2020; Korkmaz & Toraman, 2020). The difference between this study and previous research is that if in previous studies online learning was directly applied to students to find out the direct impact of online learning, in this study online learning was applied to pre-service elementary school teachers who will teach students in the era of the industrial revolution 4.0 who are familiar with gadgets and Internet. Through this activity, these pre-service elementary school teachers will have a provision of good learning technology and science material so that they are able to design learning in accordance with global changes in the era of the very massive industrial revolution 4.0. In addition, if in previous research, the impact of online learning focused more on student learning outcomes and achievements, but in this study, it did not only stop at student learning outcomes and achievements but also analyzed learning independence and Self-Awareness in Science Learning in The Covid-19 Pandemic Era.

Based on the evaluation conducted, the government implemented the next policy, namely large-scale social restrictions (PSBB) for the epicenter and red zones of the Covid-19 spread. The impact of this PSBB made the online learning process in schools and campuses extended with different time limits in each region according to the level of distribution. The increasing number of victims of the Covid-19 makes the education sector must continue to extend the period of learning from home, including higher education. The learning process at university, which was initially done classically by face-to-face, was changed to an online webinar-based application. This application-based online learning activity is undoubtedly very different from ordinary learning.

This study aims to measure/determine the level of self-regulation and self-awareness in the science learning process, to analyze students' self-regulation and self-awareness in learning science in the era of the Covid-19 pandemic. In this study, science learning for pre-service elementary school teacher during the Covid-19 pandemic was carried out online as a form of adaptation to the change in the learning paradigm from face to face to online. In addition, this learning process also aims to provide an overview of pre-service elementary school teachers about how to teach science online and still be able to achieve the expected competencies and have learning independence and self-awareness. This study is limited to the use of applications that can be used for online learning and to analyze the impact of their use on material mastery and scientific achievement of pre-service elementary school teachers. This application-based online learning began to be applied in lectures at Universitas PGRI Yogyakarta in the second week of March 2020. Some applications used are Zoom, Google Classroom, UPY E-Learning, WhatsApp Group. These applications have advantages and disadvantages each. This study aims to describe online learning in science courses at Universitas PGRI Yogyakar-

ta. Besides, this research also seeks to analyze students' self-regulated learning and self-awareness in online learning using the application.

METHODS

This study aims to describe the science learning process, analyze students' independent learning and self-awareness in science learning in the era of the Covid-19 pandemic. This research was conducted from March to July 2020, with 200 research subjects divided into four classes. The research instrument consisted of questionnaires and test questions in the online form. The data obtained were analyzed using an analysis of scores and averages. The design of this study was a modified experimental pre-test post-test control group design (Sugiyono, 2011; Fitrah, 2018). Modifications were made to control group learning, which is usually done conventionally, but in this study, it was carried out through E-learning and WhatsApp Group Application. This is done because these two applications are quite familiar and are often used when not pandemic than the other two applications. So that this research can still run online because it is not possible to carry out conventional learning through face-to-face classes. The research design can be seen in Table 1.

Table 1. Research Design

Class	Pre-Test	Treatment	Post-Test
A1-19	E1	X1	E3
A2-19	E2	X2	E4
A3-19	K1	O1	K3
A4-19	K2	O2	K4

Information:
E1, E2: Pre-Test of the experimental group
K1, K2: Pre-test of the control group
E3, E4: Post-Test of the experimental group
K3, K4: Post-Test of the control group
X1: learning with zoom meeting
X2: learning using google classroom
O1: learning with UPY E-Learning
O2: learning with the WhatsApp Group application

In this study, indicators that become a reference for developing research instruments in retrieving research data consist of indicators of self-regulated learning and self-awareness. Indicators of self-regulated learning in this study are: 1) independence of others, 2) having self-confidence, 3) behaving in discipline, 4) having a sense of responsibility, 5) behaving based on your own initiative, and 6) exercising self-control (Manganello et al., 2019). Indicators of Self-awareness in this study are: a) Recognizing one's own feelings and behavior; b) Recognizing one's own strengths and weaknesses; c) Having an independent attitude; d) Can make decisions appropriately; e) Skilled in expressing thoughts, feelings, opinions, and beliefs; f) Can evaluate themselves (Castine et al., 2019).

In this study, the data collected consisted of data on learning independence, self-awareness, and student learning achievement during online science learning. Details can be seen in Table 2.

Table 2. Types, Techniques, and Data Collection Instruments

Type of Data	Collection Technique	Instrument	Analysis Technique
Self-Regulated Learning	Observation and questionnaire	Observation sheet and questionnaire sheet	Descriptive percentage
Self-awareness	Observation and questionnaire	Observation sheet and questionnaire sheet	Descriptive percentage
Science learning achievement	Test	Question sheets for pre-test and post-test	Descriptive percentage

RESULTS AND DISCUSSION

The emergence of the Covid-19 pandemic in Indonesia in early March 2020 brought a change in the implementation of science learning in elementary school teacher education courses, Universitas PGRI Yogyakarta. Science learning was initially carried out in classrooms and laboratories, in this pandemic it has to be changed using online methods. From these various online learning support applications, four types of applications are used in science learning activities. These four applications are Zoom, Google Classroom, UPY e-learning, and WhatsApp group.

These four applications are used in four classes that carry out science learning. In summary, this description of online science learning can be seen in Table 3.

Table 3. Summary of Online Science Learning

Meeting	A1-19	A2-19	A3-19	A4-19
1-2	At this meeting, the learning of science was carried out using the Zoom application with the material of Respiratory System in Humans	In class A2, the material of Respiratory System in Humans was implemented using the google classroom application	Learning in class A3 about the respiratory system was carried out using the UPY E-Learning application	The learning process on the respiratory system material in class A4 used the WhatsApp Group application
3-4	At this meeting, science learning was carried out using the Zoom application with the material of the Circulatory System in Humans	In class A2, the material of Circulatory System in Humans was implemented using the Google Classroom application	Learning about the circulatory system in humans in this class was carried out using the UPY E-Learning application	The learning process on the circulatory system material in class A4 used the WhatsApp Group application
5-6	At this meeting, science learning was carried out using the Zoom application with material of the Hormone System in Humans	In class A2, the material hormone system in humans was implemented using the Google Classroom application	Learning the hormone system in humans in this class was carried out using the UPY E-Learning application	Learning process Hormone system material in class A4 used the WhatsApp Group application
7-8	At this meeting, science learning was carried out using the Zoom application on the material of the Nervous System in Humans	In Class A2, the material of the Nervous System in Humans was implemented using the Google Classroom application	Neural system learning in this class was carried out using the UPY E-Learning application	The learning process Neural system material in class A4 used the WhatsApp Group application

Based on Table 3, it is known that each class carried out learning activities on the same material but used different applications. The use of various forms aims to discover how the picture of self-regulated learning and self-awareness among students in each class. Self-regulated learning of students in the four classes has an average of 74.59, which is included in both categories. To see the complete self-regulated learning of students in each class can be seen in Table 4.

Table 4. Student Self-Regulated Learning in Science Learning in the Covid-19 Pandemic

Class/ Application Used	Material / Meeting				Average of Self-Regulated Learning of Students
	Human Respiratory System (1-2)	Human Blood Circulation System (3-4)	Hormone System in Humans (5-6)	Nervous System in Humans (7-8)	
A1-19/ Zoom	72,23	71,12	70,24	73,33	71,73
A2-19/ Google Classroom	74,35	76,28	75,43	75,65	75,4275
A3-19/ E-Learning UPY	71,22	74,12	73,14	71,15	72,4075
A4-19/ WhatsApp Group	78,89	79,12	77,89	79,41	78,8275

Based on Table 4, it is known that each class has different Self-Regulated Learning even though it is still in the good category. Table 4 shows that students who had the highest average of Self-Regulated Learning were in class A4-19 with the WhatsApp group application. The high self-regulated learning in class A4-19 is due to the use of a more flexible and familiar WhatsApp group application in daily life. This WhatsApp application has long been used as a popular and flexible communication tool (Amyani et al., 2018; Sutarto et al., 2018; Annamalai, 2019; Khalil, 2019; Qamar et al., 2019; Willemse et al., 2019). This application allows lecturers to send material in a variety of file formats, both docx, pdf, ppt, and even video.

The second-best class for Self-Regulated Learning is A2-19, which uses the Google classroom application. This Google classroom application has quite complete features but cannot send video files and make phone calls to the audience, and this causes some students in this class to need help from other media to interact with each other in one class. Next is the UPY E-Learning application, which is an application made from the Universitas PGRI Yogyakarta campus. This application is almost the same as Google classroom. It only has several limitations, including the inflexible file format, which can only be used to upload files with small size, and a low level of accessibility that makes students in specific areas unable to access it properly. This results in the interaction between students challenging to build up, which results in the low independence of student learning. Students' Self-Regulated Learning can be appropriately built if there is an interaction between students in a particular group (Huang, 2019; DeLuca et al., 2020; Ge et al., 2020; Tuada et al., 2020; Zainuddin et al., 2020).

The class with the lowest Self-Regulated Learning is A1-19, which used the Zoom application. This zoom application is less effective in building student self-regulated learning. It is because after the meeting is closed, the interaction between lecturers and students have been completed and interaction between students and students in one class or group so that after the material is delivered, discussion activities and results must be sent using another application. This zoom application is sufficient for use in meetings and coordination (Chick et al., 2020; Mohanty & Yaqub, 2020). In this study, the zoom application used is official or paid application so that learning can be carried out in a long duration, not only 40 minutes. The problem that arises in its use is that this zoom application requires access to a larger internet quota compared to the other three applications used in this study, besides this zoom application requires a more stable internet network. Based on this, if the Zoom application is used for learning, it will not be able to bring maximum students' self-regulated learning. Besides, this zoom application requires greater internet quota access compared to the other three forms used (Caceres et al., 2020; Lenkaitis, 2020; Sleiwah et al., 2020).

In addition to student self-regulated learning, this study also sought to see how students' self-awareness in science learning in the Covid-19 pandemic era. The percentage of students' self-awareness in learning science online using these applications can be seen in Figure 1.
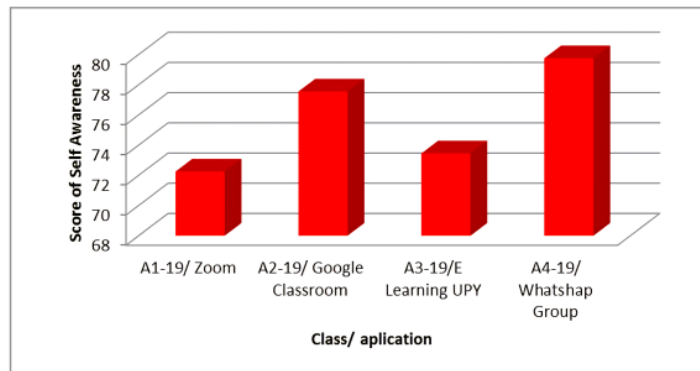

Figure 1. Students' Self-Awareness Graph

Based on Figure 1, it can be seen that students' self-awareness has a score of > 70, which is in the good category. Based on data analysis from questionnaires filled out by students, it is known that the average percentage of self-awareness overall was 75.75 in the good category. This good self-awareness occurs because, during learning, it includes some information about Covid-19.

Respiratory system material is the primary material used to enter information about Covid-19, so students know and be aware of Covid-19. Information about how Covid-19 enters the human body then infects parts of the respiratory tract to the lungs that can cause death if not handled properly. Self-awareness in class A4 -19 is the highest among the other classes. While the class with the lowest self-awareness is class A1-19, this happens because of differences in the use of applications in the delivery of learning. The WhatsApp application has proven to be effective in several places for online lectures (Akkara et al., 2020; Rahaded et al., 2020). The effectiveness can be felt in several non-face-to-face lecture events and recommend that an adequate evaluation be made of the WhatsApp application (Chan et al., 2020; Soria et al., 2020).

In addition to Self-Regulated Learning and self-awareness from online learning, it is also seen how student achievement is in each class. The results of an average analysis of student achievement measured using online test questions can be seen in Table 5.

Table 5. Student Achievements in Learning Science Online

Class / Application	Material / Meeting				Average Achievement
	Human Respiratory System (1-2)	Human Circulatory System (3-4)	Hormone System in Humans (5-6)	Nervous System in Humans (7-8)	
A1 -19/ Zoom	70,25	72,44	71,35	73,33	71,8425
A2-19/ Google Classroom	76,78	77,76	75,45	75,65	76,41
A3-19/ E-Learning UPY	73,33	73,43	71,52	73, 45	72,76
A4-19/ WhatsApp Group	80,56	81,78	81,34	79,45	80,7825

Based on Table 3, it is known that the value of students who take online science learning reaches > 70. If it is calculated, the average student achievement is 74.59 in the good category. This average score indicates that students well receive substantially the material submitted online. Furthermore, if linked between self-regulated learning, self-awareness, and student learning achievement, there is a connection between one another. The interrelationship of the average score of the three variables can be seen in Figure 2.
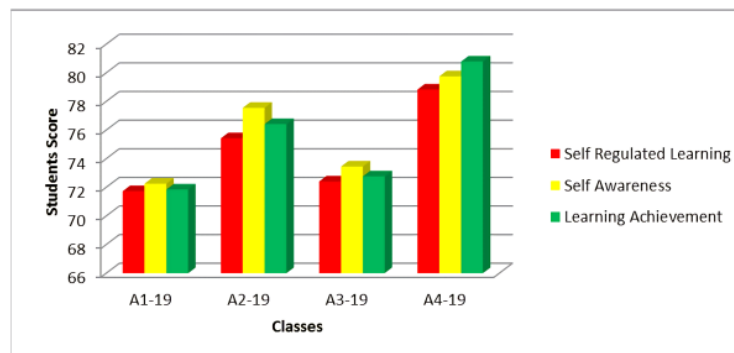

Figure 2. Graph of Relationship Between Variables

Based on Figure 2, it is known that the class with the highest score is A4-19, while the class with the lowest score is A1-19. The difference in student achievement scores is due to the use of applications in the implementation of online learning. The use of applications in this learning can affect the results of the learning process (Pila et al., 2019). The most common and flexible learning applications in this study can provide maximum results. This is consistent with the research

results that the form of adequate limits is used to reduce academic procrastination (Purnama et al., 2019).

In Figure 2, it can also be seen that between self-regulated learning and self-awareness affect each other wherein each class, if self-regulated learning is high, then self-awareness will also be high. This is in line with the results of the study of Kirkpatrick et al. (2019), Kremer et al. (2019) Alghamdi et al. (2020), Jansen et al. (2020), which shows that Self-Regulated Learning and self-awareness influence each other.

This interrelated and influential relationship does not occur in student achievement. It appears that classes A1, and A3 tend to have lower achievement than self-regulated learning and self-awareness scores, although still in the good category. In contrast to what happened in A4, it was seen that student learning achievement was higher than the score of self-awareness and self-regulated learning. This difference is caused by the advantages of applications used in class A4, which are easier to use and have more complete features and can share files with larger sizes in various formats. The advantages of this application are not owned by applications used in classes A1, A2, and A3 so that with more complete and adequate information, the achievement of the class A4 is better than other classes. Proper knowledge of various sources can provide increased student learning achievement (Schneider & Preckel, 2017; Cayvaz et al., 2020; Hoxmeier & Lenk, 2020; ra et al., 2020).

Based on the results of data analysis in this study, it is known that the average score of learning independence is 74.59 (good), the average score of self-awareness is 75.75 (good), and the average learning achievement is 74.59 (good). The difference between this study and previous research is that in previous studies the implementation of online learning was forced to adjust to the pandemic conditions that occurred, but in this study, it was carried out with clear objectives and careful planning. In this study, learning is designed to adapt to pandemic conditions and foster learning independence and self-awareness of pre-service elementary school teachers. In previous online learning, it focused on one application and one goal of increasing learning achievement (Dunn & Kennedy, 2019; Larrabee Sønderlund et al., 2019; Liao et al., 2019; Yeh et al., 2019). This study, besides achievement, also tries to provide good mastery of technology and material provisions for pre-service elementary school teachers. Based on these things, the novelty in this study is that online learning carried out in this study pro-

vides better results with broader aspects, namely not only aspects of achievement but also independent learning and self-awareness.

CONCLUSION

Based on the results of this study, it is known that online learning using the Zoom application, Google Classroom, UPY E-Learning, and WhatsApp Group can make students more independent in learning, have self-awareness, and good learning achievement. Based on the analysis, it is known that the average score of Self-Regulated Learning is 74.59 (good), the average score of Self-Awareness is 75.75 (good), and the average learning achievement is 74.59 (good). It can be concluded that this online science learning takes place optimally, has a useful value that is seen from the average number of independent learning, self-awareness, and student learning achievement that are in the good category.

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