

**ANALYSIS OF ONLINE LEARNING METHODS ON THE
EFFECTIVENESS OF CHEMISTRY LEARNING DURING THE
COVID-19 PANDEMIC ON MUHAMMADIYAH SENIOR HIGH
SCHOOL 3 BATU STUDENTS**

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Abstract

This study aims to reveal the differences in the effectiveness of chemistry learning before and after using online learning methods during the Covid 19 pandemic for Muhammadiyah Senior High School 3 Batu students. This type of research is expo facto using a quantitative approach. The research population was class 12th grade student from Science 2 and Science 3 of Muhammadiyah Senior High School 3 Batu Students with a total of 62 people. Samples were taken using a non-random sampling technique, namely purposive sampling with an analytical formula. In this analysis method, using 2 stages, namely univariate analysis and bivariate analysis. The findings reveal that before online learning more students got good results on chemistry, with the average score of 89,9. Meanwhile, after online learning was 88,2. Therefore, from the results of the bivariate test analysis showed that there were differences in the effectiveness of learning chemistry before and after online learning for students.

Keywords: *Online Learning, Learning Method, Chemistry, Covid-19*

1. INTRODUCTION

COVID-19 has had an impact on conditions of activity, which have been restricted or even temporarily eliminated, not only in the economic, social, and technological sectors but also in the education sector, as a result of the pandemic outbreak. Government efforts to protect Indonesian population from the lethal disease COVID19 have taken a variety of shapes and forms over time. The learning process in high school has transitioned from being conducted offline to being conducted online using applications such as WhatsApp, Google Classroom, Zoom, Edmodo, and others as recommended by the government.

The Covid-19 pandemic has forced the learning system in schools to change drastically from face-to-face meetings to online learning. This learning is carried out from elementary school to university level. Teachers need to make maximum use of learning media and online learning methods. This is to support the implementation of online learning during the pandemic which has not been determined when the application of online learning ends. Therefore, the learning development of a child depends on whether or not the teacher's education and learning process (PBM) is good.

The stay-at-home policy encourages teaching staff to look for new innovations that can be used in learning activities at home. Not all regions in Indonesia can experience an uninterrupted internet connection and not all students in Indonesia have smartphones. This will only have an impact on students' stress without making them understand the subject

matter given. As a result, education and learning activities are not carried out effectively, as conventional methods are usually practiced in schools, because teaching practices have not yet adopted learning.

The implementation of online learning during the spread of COVID-19 raises various problems (Ahmad, 2020). One of them is that both lecturers and students still have difficulty operating the online application. Difficulty in mastering and understanding the material is caused by the disruption of sending information from lecturers to students due to the use of inappropriate learning media (Ferdiana, 2020). Interesting and fun learning media will be able to eliminate boredom in learning. Students' online lectures require their own variations to eliminate boredom. In addition to the use of interesting learning media in online learning, lecturer creativity is very necessary in learning to avoid boredom (Hikmat et al., 2020).

Based on initial observations made at Muhammadiyah Senior High School 3 Batu, some of them most of the learning process in schools both teachers and students cannot be done online due to the lack of existing facilities. This phenomenon is also shown because they can only listen to the teacher's explanation or study independently, do not see the active participation of students and are only given information, so they are not trained to develop their analytical and reasoning skills. Even students have not been able to analyze the existing information. Therefore, an online-based learning analysis with a scientific approach is needed so that the analysis provides information on whether teachers can use these methods and how these methods can be used by teachers in the learning process so that learning objectives can be achieved. This study is expected to reveal differences in the effectiveness of chemistry learning before and after using online learning methods during the Covid 19 pandemic for Muhammadiyah Senior High School 3 Batu students.

2. RESEARCH METHOD

This type of research is expo facto using a quantitative approach. The research population was class 12th grade student from science 2 and Science 3 of Muhammadiyah Senior High School 3 Batu Students with a total of 62 people. By taking samples using a non-random sampling technique, namely purposive sampling with an analytical formula. In this analysis method, using 2 stages, namely univariate analysis and bivariate analysis.

Conceptual Framework

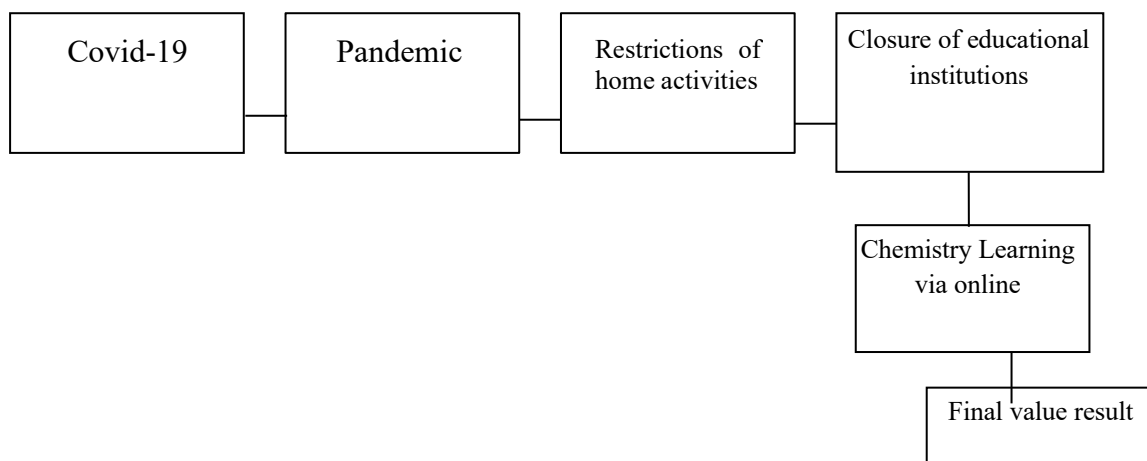


Figure 1 Conceptual Framework

Hypothesis

H_0 : There is no effect in the effectiveness of learning chemistry before and after using the online method during the Covid-19 pandemic for Muhammadiyah Senior High School 3 Batu Students

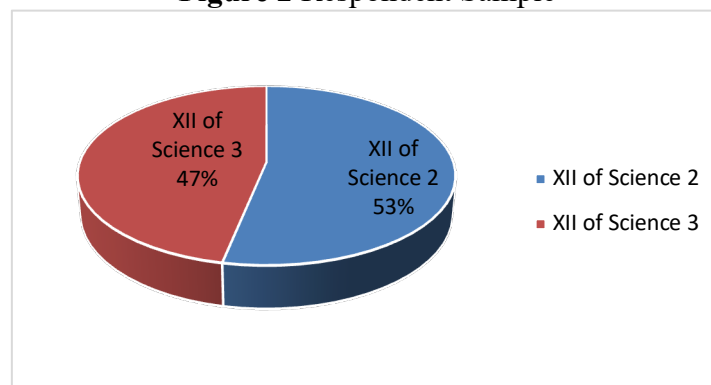
H_a : There is an effect in the effectiveness of learning chemistry before and after using the online method during the Covid-19 pandemic for Muhammadiyah Senior High School 3 Batu Students

3. RESULT AND DISCUSSION

3.1. Research Result

3.1.1. Characteristics of Respondents

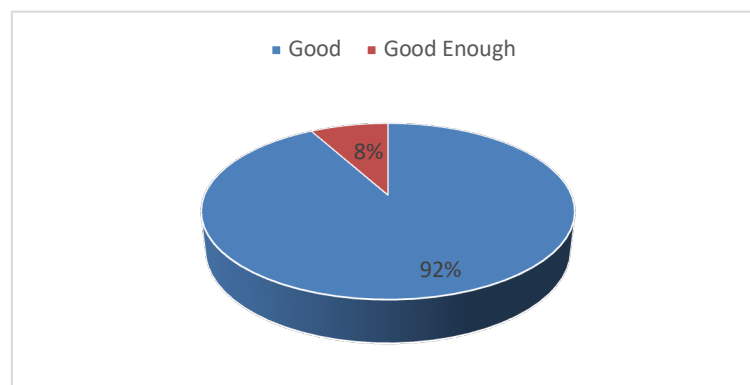
Figure 2 Respondent Sample



Based on figure 2, it can be seen that the number of samples that became respondents in this study were 62 students consisting of female gender, 33 respondents from 12th grade student of Science 2, while 29 respondents from 12th grade student of Science 3.

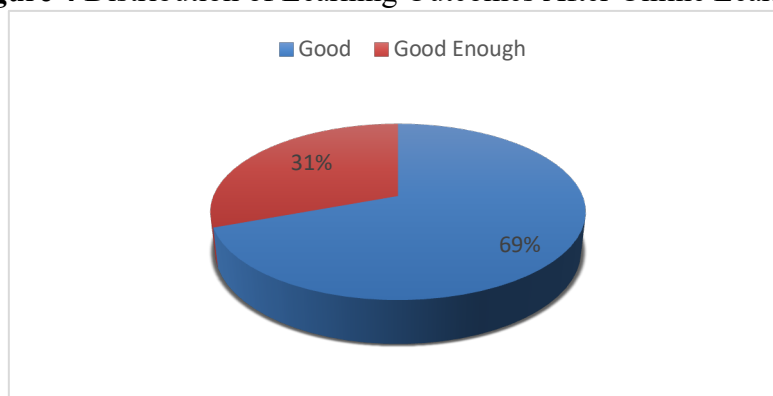
3.1.2. Univariate Analysis Results

Figure 3 Distribution of Learning Outcomes Before Learning Online



Based on Figure 3, it shows that before learning online 57 students (92%) got good results, and 7 students (8%) got good enough learning outcomes.

Figure 4 Distribution of Learning Outcomes After Online Learning



Based on Figure 4, it shows that after online learning 43 students (69%) got good results, and 19 students (31%) got good enough learning outcomes.

Table 1 Distribution of Student Learning Outcomes

Description	N	Min	Max	mean
Learning outcomes before online	62	76	96	89.8387
Learning outcomes after online	62	77	96	88,129

Based on table 1, shows that the mean score of students before online learning for chemistry subjects is 89,8. Meanwhile, the mean score of students after studying online for chemistry subjects is 88,1.

3.1.3. Bivariate Analysis Results

Table 2 Comparison of the Effectiveness of Chemistry Learning Before and After Online Learning

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		Learning outcomes before online learning		Total	<i>p Value</i>
		Good	Good Enough		
Learning outcomes after online learning	Good	41	16	57	0.001
	Good Enough	2	3	5	
Total		43	19	62	

Based on table 2, respondents whose learning outcomes before online learning are good and after online learning are good are 41 people. Respondents who before online learning got good enough learning outcomes and after online learning increased to good as many as 16 people. Respondents who had good learning outcomes before online learning but decreased after online learning became good enough only 2 people. Respondents who have good learning outcomes before online learning and after online learning are good enough as many as 3 people.

Table 3 Respondents' Assessment of Learning Effectiveness

			Total Student Perception Score on The Effectiveness of Online Learning	Student Grades After Learning Online
Spearman's rho	Total Student Perception Score on The Effectiveness of Online Learning	Correlation	1,000	.015
		Coefficient		
		Sig. (2- tailed)	.	.909
		N	62	62
	Student Grades After Learning Online	Correlation	.015	1,000
		Coefficient		
		Sig. (2- tailed)	.909	.
		N	62	62

Based on the output results, the value of Sig. of 0.015 (Sig. < 0,05), indicating that the correlation between perception scores and students' scores was significantly significant. The correlation coefficient value of 0,909 indicates a positive correlation with a very strong correlation strength.

3.2. Discussion

The effectiveness of learning can be achieved if it is able to provide new experiences, shape student competencies and deliver students to the goals to be achieved optimally. Effectiveness is also an important factor in learning, namely the match between students who carry out learning with learning objectives or goals to be achieved to obtain good results (Pangestika, 2018).

Based on the results of the statistical test, the value of $p = 0.001 < 0.05$, it can be concluded that H_0 is rejected and H_a is accepted, meaning that there are differences in the

effectiveness of chemistry learning before and after using online methods during the Covid19 pandemic for Muhammadiyah 3 Batu High School students. Meanwhile, the respondent's preferred method when learning online is giving individual assignments and respondents mostly doing activities during online learning, namely learning and playing with cellphones because in doing assignments and using zoom media when learning takes place they usually use handtrees. As a result of using cell phones while studying online, many students experience physical ailments centered on eye strain and complain of a little sleepiness. This physical ailment is the result of overuse of the device.

The use of mobile phones for a long time during the online learning process has a negative impact on eye strain, this is related to using mobile phones for more than 4 hours and can cause eye pain, redness, and dizziness.(Suciana, 2016)This is in line with the opinion(Maryamah, 2011)which states that there is a significant relationship between computer use and eye strain complaints.

The effectiveness of learning can be interpreted as the influence, impression, or success of a learning process carried out. In other words, according to Rahmawati & Sumaryati (2015) learning effectiveness is a measure of the success of the interaction process in educational situations to achieve learning objectives. Of course, effective learning activities are needed by students to help develop children's thinking power according to their level of understanding and age.

Previous research conducted by Mustakim (2020) about the effectiveness of learning who dare to use online media during the covid19 pandemic in mathematics subjects, illustrates that students' assessment of learning mathematics using online media is very effective (23.3%), most of them are considered effective (46.7%), and are rated average. - average (20%). Although there are also students who think learning is not effective (10%).

The use of online media in learning that allows students to have a high enthusiasm for learning and doing assignments. Research result by Sianturi & Lisum (2018) shows that the use of the internet by students can significantly affect students' motivation in using e-learning. This is in line with Aurora & Effendi (2019); Ibrahim & Suardiman (2014); and Puspitasari et al. (2019) which reveals that there is a positive and significant effect between the use of e-learning learning media and students' learning motivation. Further, Nadziroh (2017) added that e-learning is effective in improving the quality of learning, because the learning process is not only fixed in one time and in a room.

4. CONCLUSION

To sum up everything that has been stated so far, it can be conclude that before online learning more students got good results, with the average score of 89,9. Meanwhile, after online learning was 88,2. Therefore, from the results of the bivariate test analysis showed that there were differences in the effectiveness of learning chemistry before and after online learning for students.

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