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Effectiveness of Problem-Based Learning Method in Online Learning

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Abstract

The COVID-19 pandemic that occurred in early 2020 had an impact on the learning system in universities that switched to an online learning system. This causes the learning process to experience various challenges, especially in the health sector which requires direct practice. The purpose of this study was to assess the effectiveness of the Problem-Based Learning (PBL) method for students of the Faculty of Health, Dian Nuswantoro University in online learning. The method used was quantitative analytic with a cross-sectional approach, the respondents in this study were 326 students from three study programs. The results showed that 58% of students with good learning achievement, 52% had high learning interest, and 79% obtained good learning outcomes. 59% of learning briefings from lecturers were good, and 51% of the field learning process was good. Problem-based learning (PBL) is proven to improve students' understanding of course material, encourage active participation, and help develop problem-solving and critical-thinking skills. However, it is problematic if there is a lack of direct interaction with lecturers and limited internet access. To improve the effectiveness of PBL in the future, it is necessary to improve technological infrastructure, intensive training for lecturers, and the development of more interactive digital learning platforms.

Keywords*: Problem-Based Learning, Online Learning, Learning Outcomes, Health Education.*

1. INTRODUCTION

The COVID-19 pandemic that emerged in early 2020 affected all sectors, including education. The learning system shifted from in-person learning at schools and universities to a home-based learning model, often referred to as BDR (Belajar Dari Rumah) or online learning (Daring). The implementation of the BDR system or Online learning during the pandemic has caused various problems experienced by educators, both in terms of learning implementation and learning evaluation.

The online learning system has led to various learning innovations, including the use of platforms such as Google Meet, Zoom Meeting, Google Classroom, YouTube,

television, and social media like WhatsApp. Based on Hastuti and Marzuki (2021) research, the online learning system has several problems, such as educators will have difficulty in conducting assessments to fulfill learning evaluations, students and educators are required to have good internet network access, many areas have poor or not smooth internet access so that it becomes one of the obstacles to teaching and learning activities, not a few students do not get maximum learning results, both from subject matter and assignments, limited mastery of information technology by educators and students, inadequate facilities and infrastructure, technology support devices are clearly expensive, internet quota costs are also something that hinders.

According to research by Argaheni (2020), online learning has several impacts on students. It was found that online learning can be confusing for students, leading to tendencies of passiveness, reduced creativity and productivity, and an overload of information or concepts that may become less beneficial. Students also experienced stress, although there was an improvement in their language literacy skills.

The online learning process that has been running for a long time is deemed inappropriate, especially for health students who need practice in the field, this is in line with research on students at the early age level and lower grades in elementary education because students are still not psychologically independent. Online learning eliminates the main essence of the process of internalizing knowledge and skills of students who still need the assistance of educators as a substitute for parents who are busy working (Anggianita et al., 2020 & Dewi, 2020).

The sudden shift from conventional learning to online learning caused many educators to experience cultural shock, especially those who were less familiar with technology. This rapid change impacted the alignment of planning, learning processes, and evaluation activities that had been previously designed. Teaching activities often became limited to uploading materials and assigning tasks for students to study independently or in groups (Hutauruk & Sidabutar, 2020; Rigianti, 2020).

The development of online learning methods during the pandemic needs to be implemented in an effort to improve the quality of education and learning outcomes. The problem-based learning method is a learning model based on constructivism and

accommodates student involvement in learning and involves contextual problem solving (Desnylasari et al., 2016). Learning through solving problems has been initiated thousands of years ago, students can learn through a series of activities or learning processes that involve students actively in finding their own answers.

The Faculty of Health Science at Universitas Dian Nuswantoro offers three study programs: the Bachelor of Public Health, the Bachelor of Environmental Health, and the Diploma in Medical Records. These programs heavily emphasize skills and practical experience, both in community settings and workplaces such as hospitals, community health centers (Puskesmas), and industries. Based on this background, it is essential to develop a learning system that incorporates the Problem-Based Learning (PBL) method to improve education quality and better prepare Dian Nuswantoro University health graduates for the workforce.

2. METHOD

This study used quantitative analytic research with a cross-sectional approach because the data were taken at the same time. The population in this study were all students of the Faculty of Health Science consisting of 3 study programs, namely Bachelor of Public Health, Bachelor of Environmental Health and Diploma III Medical Records and Health Information who had taken PBL, PKL and PL courses and obtained. A total of 326 students participated in the study, consisting of 137 Diploma III Medical Records and Health Information (D3 RMIK) students, 6 Bachelor of Environmental Health (S1) students, and 183 Bachelor of Public Health (S1) students. Data collection uses primary data, where students are given a Google Form link which students directly fill in and submit using the cellphone owned by the student. This study has obtained ethical permission from the Ethics Commission of the Dian Nuswantoro Faculty of Health with No. 314/EA/KEPK-FM: 314/EA/KEPK-Fkes-UDINUS/X/2022.

3. RESULTS AND DISCUSSION

Based on the identification results obtained through the Google Form distributed to all students of the Faculty of Health, the data collected includes 137 Diploma III Medical Records and Health Information (D3 RMIK) students, 6 Bachelor of

Environmental Health (S1) students, and 183 Bachelor of Public Health (S1) students. The following data were obtained:

Table 1. Faculty of Health Online Learning Achievement

No	Question	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
1	During online learning, I can use the learning tools (Kulino) well.	201	61.7	107	32.8	15	4.6	2	0.6	1	0.3
2	Online learning is very helpful in understanding the general objectives of the course.	81	24.8	125	38.3	99	30.4	19	5.8	2	0.6
3	Online learning is more capable of making it easier to remember the learning that was delivered previously.	77	23.6	98	30.1	105	32.2	41	12.6	5	1.5
4	Lecturers always make sure students can attend lectures.	98	30.1	119	36.5	88	27	16	4.9	5	1.5
5	The lecturer's mastery of the material can be conveyed well.	102	31.3	134	41.1	73	22.4	15	4.6	2	0.6
6	Lecturers provide material according to the lesson plan (RPS).	158	48.5	137	42	27	8.3	4	1.2	0	0
7	The assignments given were able to help me understand the material.	115	35.3	146	44.8	56	17.2	7	2.1	2	0.6
Mean = 28.34											
Median = 28.00											
Sig = 0.002											

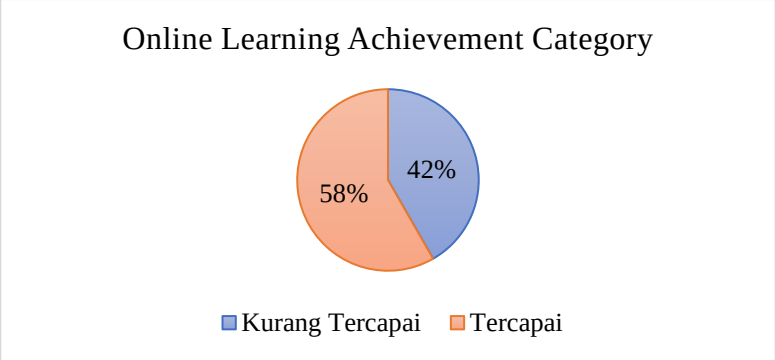

Chart 1. Online Learning Achievement Categories

For the Online Learning Achievement Category, the results showed that 58% (190) of the Online Learning Process fell into the Achieved category and the remaining 42%

(136) felt that it was not achieved. So, it can be concluded that respondents experience learning achievement when online / online to reach 58%.

Table 2. Faculty of Health Learning Interests

No	Question	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
1	Online learning makes me more enthusiastic in attending lectures?	95	29.1	97	29.8	87	26.7	39	12	8	2.5
2	I enjoy participating in online learning.	136	41.7	90	27.6	64	19.6	27	8.3	9	2.8
3	Since online learning, I have always been highly motivated to learn.	76	23.3	116	35.6	94	28.8	34	10.4	6	1.8
4	Online learning increases attention in lectures.	82	25.2	99	30.4	97	29.8	39	12	9	2.8
5	When experiencing difficulties, I ask my lecturer/friends.	129	39.6	116	35.6	59	18.1	19	5.8	3	0.9
6	The material uploaded to the Kulino LMS is varied and interesting.	112	34.4	121	37.1	80	24.5	12	3.7	1	0.3
7	Since going online, I have been able to complete my assignments on time.	144	44.2	125	38.3	42	12.9	12	3.7	3	0.9
Mean = 27.29											
Median = 28.00											
Sig = 0.000											

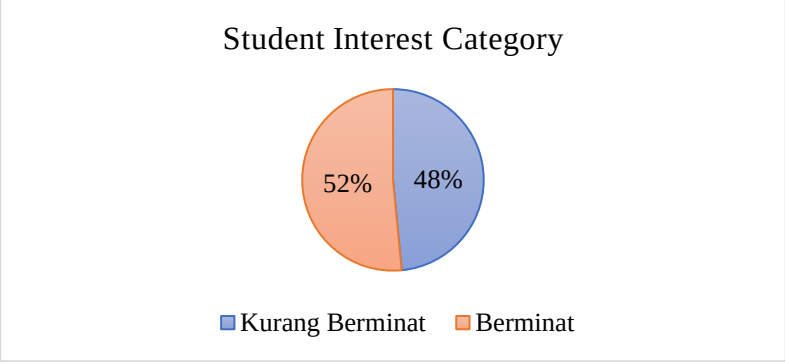

Chart 2. Online Learning Interest Categories

For the Student Learning Interest Category, the results showed that 52% (168 students) expressed an interest in learning during online classes, while the remaining 48% (158 students) reported having low interest. Thus, it can be concluded that 52% of respondents showed an interest in learning during online sessions.

Table 3. Faculty of Health Online Learning Outcomes

No	Questions	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
1	During Online Learning, my final exam score is	143	43.9	123	37.7	53	16.3	5	1.5	2	0.6

	increasing.										
2	During Online learning, I got maximum score of my final exam.	148	45.4	125	38.3	46	14.1	5	1.5	2	0.6
3	When learning Online my Final Score gets the maximum result.	151	46.3	128	39.3	39	12	8	2.5	0	0
Mean = 12.79											
Median = 12.00											
Signifikansi = 0.000											

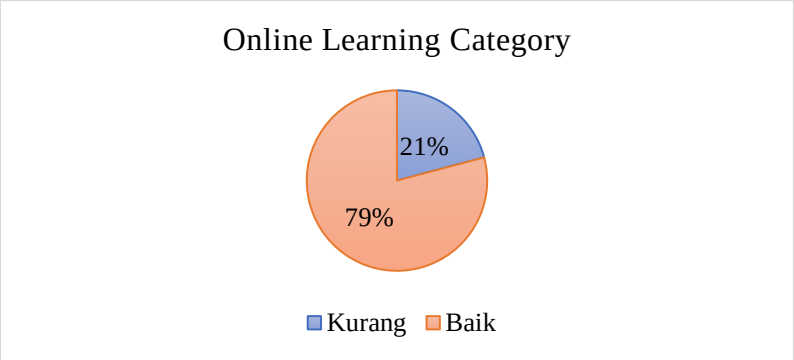

Chart 3. Online Learning Outcomes Category

For the Respondent / Student Learning Outcome Category, the results obtained 79% (258) of respondents' learning outcomes when online fall into the Good category and the remaining 21% (68) feel less good. So, it can be concluded that respondents have good learning outcomes online to reach 79%.

Lecture activities related to the problem-based learning method, the results of the achievement of activities carried out before going to the field, namely related to providing material to assistance during field implementation can be seen in the following table:

Table 4. Pre-Field Debriefing

No	Questions	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
1	Lecturer or Coordinator provides debriefing before going to the field / agency / community.	207	63.5	103	31.6	14	4.3	2	0.6	0	0
2	I understand the debriefing from the lecturer/coordinator of PL/PKL/PBL	144	44.2	142	43.6	32	9.8	8	2.5	0	0

3	The stages or flow of PL/PKL/PBL activities have been explained in detail by the lecturer/coordinator.	157	48.2	130	39.9	33	10.1	6	1.8	0	0
4	I understand the stages or flow of each PL/PKL/PBL activity	146	44.8	140	42.9	33	10.1	6	1.8	1	0.3
5	I was given the opportunity by the lecturer/coordinator to ask if anything was unclear during the debriefing.	188	57.7	120	36.8	13	4	5	1.5	0	0
Mean = 22.02											
Median = 22.00											
Sig = 0.000											

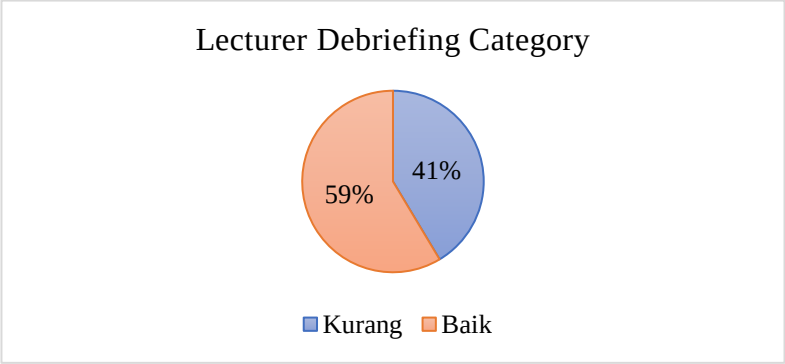

Chart 4. Lecturer Debriefing Category

For the Lecturer Debriefing Category, the results showed that 59% (191) of the Debriefing Categories provided by Lecturers were Good and the remaining 41% (135) felt Less Good. So it can be concluded that the learning briefing provided by lecturers when online falls into a good category to reach a percentage of 59%.

Table 5. Learning in the Field

No	Questions	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
1	During workplace learning (hospital/community/industry) I identify problems.	193	59.2	107	32.8	23	7.1	3	0.9	0	0
2	While in the field, receive guidance from field supervisors.	151	46.3	128	39.3	39	12	5	1.5	3	0.9
3	During the	145	44.5	118	36.2	51	15.6	10	3.1	2	0.6

No	Questions	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
	pandemic, I remained at the PL/PBL/PKL site.										
4	During the pandemic, learning in the field should be done online.	106	32.5	84	25.8	79	24.2	23	7.1	34	10.4
5	Academic supervisors monitored me during my time in the field.	109	33.4	115	35.3	82	25.2	14	4.3	6	1.8
6	I formulated the problems found in the field.	149	45.7	135	41.4	39	12	3	0.9	0	0
7	I looked for the root causes of the problems on the ground.	161	49.4	132	40.5	29	8.9	4	1.2	0	0
8	I prioritized the causes of the problem with my field supervisor and academic advisor.	143	43.9	124	38	54	16.6	3	0.9	2	0.6
9	Learning in the field makes me understand better and clearer.	197	60.4	99	30.4	27	8.3	3	0.9	0	0
10	Field learning during the pandemic is conducted online.	98	30.1	85	26.1	78	23.9	34	10.4	31	9.5
11	I analyzed the results of my field learning by looking for supporting references.	153	46.9	133	40.8	36	11	4	1.2	0	0
12	I compiled an activity report while in the field.	194	59.5	105	32.2	21	6.4	5	1.5	1	0.3
13	Supervisors guide in preparation of activity reports.	150	46	120	36.8	44	13.5	8	2.5	4	1.2
14	The field supervisor directed me in preparing the activity report.	146	44.8	124	38	44	13.5	10	3.1	2	0.6
15	I presented the final activity report to the field supervisor.	170	52.1	110	33.7	35	10.7	8	2.5	3	0.9
16	I presented the final report of the activity to the	186	57.1	97	29.8	34	10.4	6	1.8	3	0.9

No	Questions	SS		S		N		TS		STS	
		T	%	T	%	T	%	T	%	T	%
	academic supervisor and the examining lecturer.										
17	I understand learning in the field better than theory in the classroom.	145	44.5	109	33.4	66	20.2	4	1.2	2	0.6
18	During the pandemic, I prefer field learning to be done online.	94	28.8	68	20.9	82	25.2	42	12.9	40	12.3
19	More learning experience in the field than in the classroom.	149	45.7	94	28.8	74	22.7	6	1.8	3	0.9
20	I prefer to study in class.	73	22.4	75	23	130	39.9	33	10.1	15	4.6
Mean = 82.87											
Median = 83.00											
Sig = 0.045											

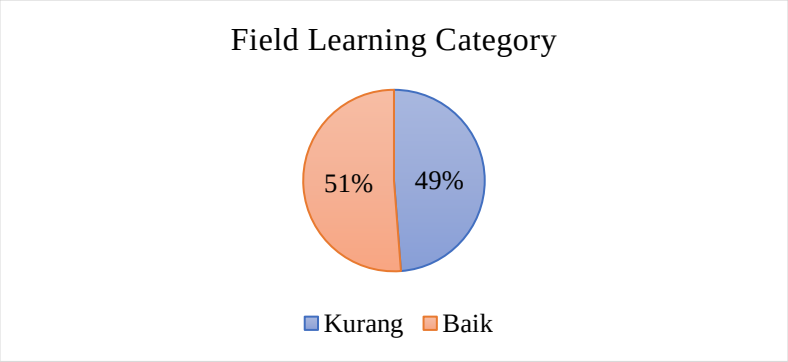

Chart 5. Field Learning Categories

For the Learning in the field category, the results obtained were 51% (167) were good and the remaining 49% (159) were poor. So it can be concluded that since the pandemic, the learning process in the field has been categorized as good with a percentage of 51%.

Based on the results of the study, the online learning program of the Faculty of Health, Dian Nuswantoro University uses a Problem-Based Learning (PBL) approach that produces various kinds of outcomes in the form of learning achievement, interest, learning outcomes, and debriefing and learning in the field. Overall, 58% of students achieved their online learning outcomes. This shows that even with an online approach,

most students can understand the material well. The use of learning platforms such as Google Meet application, Zoom meeting, Google Classroom, YouTube, television, WhatsApp, and Kulino, which facilitate lecturers and students to interact, is one of the elements that contribute to this achievement. However, 42% of students did not achieve their online learning goals. Limited internet access, lack of direct engagement, and difficulty understanding more complicated content can all contribute to this. Kuntarto (2017) says that for students to benefit from online learning, lecturers must be creative and skillful in delivering information. Another study by Rigianti (2020) found that the main barriers to online learning are ineffective communication, technological limitations, and internet network restrictions that affect the quality of online education.

In this study, 52% of students showed a high interest in learning in online learning. Problem-based learning (PBL) motivates students to play an active role in critical thinking through developing scientific concepts, data collection and analysis, and problem-solving by developing arguments. Problem-based learning (PBL) can help students build their knowledge through solving contextual problems (Adica, n.d.). In addition, this study is by Ayukanti's (2017) research, which found that the application of the Problem-Based Learning (PBL) method requires active participation of students in the learning process, it can motivate, perseverance and hard work of students in learning and completing the project. Phumeechanya and Wannapiroon's (2013) research, found that a Problem-Based Learning (PBL) based learning environment that utilizes technology can improve problem-solving skills and deeper context understanding. Problem-based learning (PBL) is a successful method for developing students' critical thinking skills through solving real problems that match the learning context (Ardianti et al., 2021). However, Argaheni's (2020) research found that students who learn online tend to be passive, less creative, and easily bored, all of which decrease their motivation to learn. The importance of interactive and problem-solving-based learning strategies for students to learn online.

Students had good learning outcomes of 79% in this study. This shows that online learning can improve students' understanding of lecture material, especially if it places a strong emphasis on contextual problem-solving with Problem-Based Learning (PBL) (Shoimin, 2014). According to Aslan's research (2021), in online lectures,

student participation, communication skills, and learning achievement can increase with Problem-Based Learning (PBL). Learning materials that are by the RPS are available and lecturers actively guide during the learning process and also contribute to this achievement. In addition, research by Anggianita et al. (2020) explained that comparable difficulties are also experienced in online learning of elementary education, more intensive guidance for students is needed to fully understand the subject matter. Thus, creative teaching strategies such as Problem-Based Learning (PBL) to increase student engagement and conceptual understanding are needed.

A total of 59% of students gave a good assessment of the learning briefing provided by lecturers. This briefing includes the flow of activities, implementation recommendations, and a thorough explanation of learning objectives. This helps students to be able to carry out even though activities are carried out in the midst of a pandemic. The guidelines for implementing learning in the midst of a pandemic are in line with the guidelines made by the Indonesian Ministry of Education and Culture Kemendikbud RI guidelines (2021), emphasizing the importance of implementing health protocols into a small number of in-person and online learning activities. 51% of students with the category of learning in the field are good. The causes of Problem-Based Learning (PBL) achievement include teaching students to identify problems, prioritize problems, and develop solutions based on information collected from the field (McNiff, 1992). Although online learning can be effective, Mishra et al. (2020) say that there are challenges in ensuring optimal practical understanding without intensive in-person interaction.

Based on this research, it shows that the Problem-Based Learning (PBL) approach is very promising to improve students' understanding of the subject matter, learning objectives, and critical thinking skills. However, the application of this approach requires the best possible infrastructure, facilities, and readiness of students and lecturers. To increase the effectiveness of the Problem-Based Learning (PBL) method in the future, intensive training for lecturers in developing online Learning-based materials is recommended (Suyanti, 2010), students have greater access to interactive digital learning platforms, and technical guides are provided to help students understand the concepts taught using this approach (Dhawan, 2020; Rapanta et al.,

2020). If used correctly, Problem-Based Learning (PBL) techniques can be a useful strategy to overcome learning difficulties during and after the pandemic.

4. CONCLUSION

Problem-Based Learning (PBL) during online learning significantly improves learning achievement, interest, learning outcomes, and debriefing and learning in the field. The results of this study, as many as 58% of students with their online learning attainment achieved; despite having limitations in online learning, Problem-Based Learning (PBL) can increase students' engagement, drive, and problem-solving ability. In addition, 52% of students with high interest in learning in online learning, encouraging active participation and independent learning. 79% of students with good learning outcomes, helping to improve understanding. However, the main problems encountered are poor internet connectivity, limited live interaction, and lack of direct communication with the tutor. To optimize the benefits of Problem-Based Learning (PBL) in future implementations, infrastructure improvements, better learning platforms, and equitable educator training are required. By addressing these issues, Problem-Based Learning (PBL) can be further developed as an effective method to help health education students achieve their academic goals.

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NOVELTY

This research discusses the Problem-Based Learning (PBL) method in online learning for students of the Faculty of Health Science Universitas Dian Nuswantoro through various platforms. Providing new insights on how Problem-Based Learning (PBL) can improve learning achievement, interest, learning outcomes, and debriefing and learning in the field is also in this research. In addition, this study emphasizes the importance of providing comprehensive digital learning support, which includes platform development

and educator training, to optimize the success of the Problem-Based Learning method in online learning plans.

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