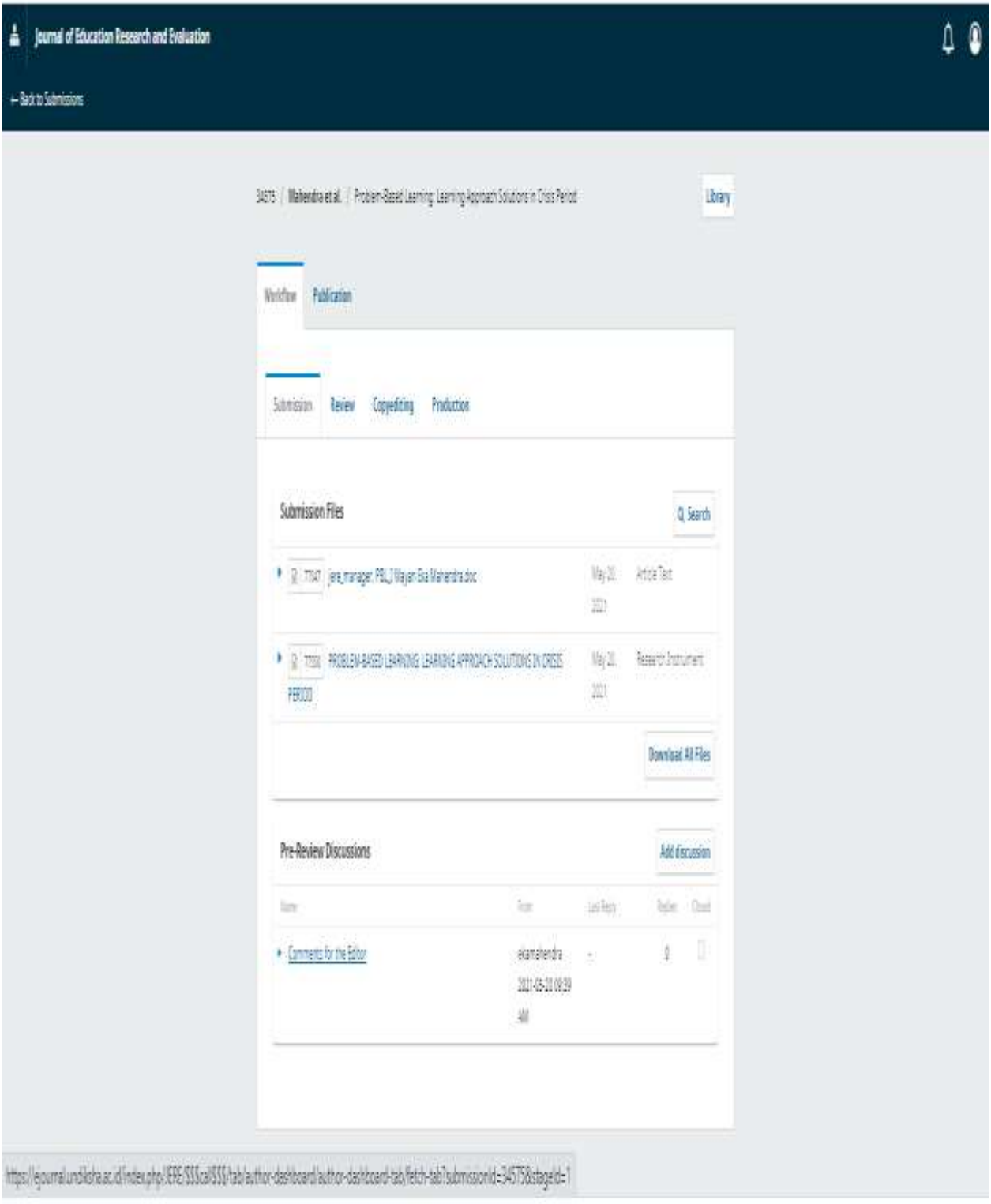
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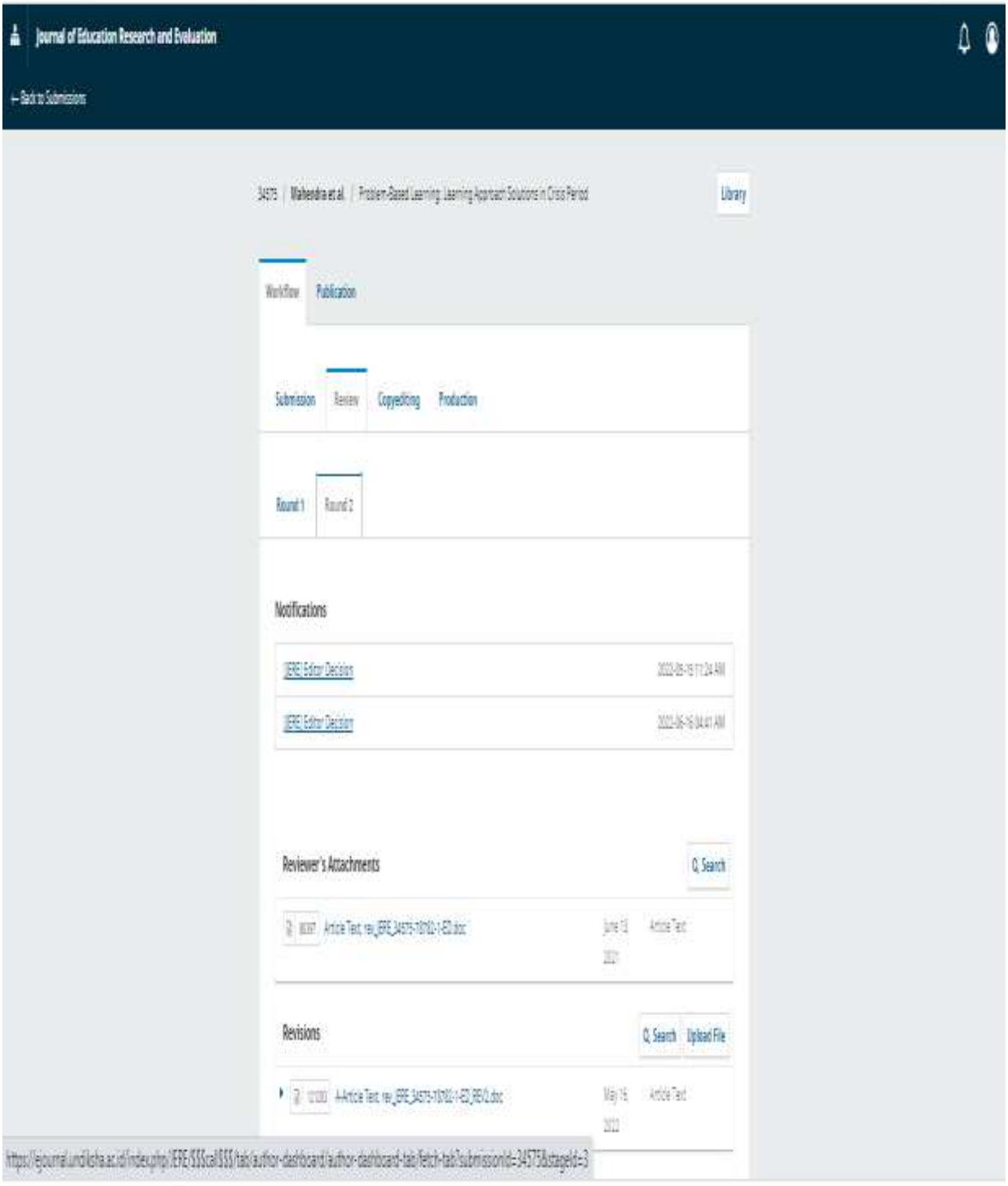
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PROBLEM-BASED LEARNING: LEARNING APPROACH SOLUTIONS IN CRISIS PERIOD

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ABSTRACT

The background of this study was the poorly of learning activity by using a conventional approach during the Covid-19 pandemic. Moreover, it is presumed that the learning loss has occurred. Therefore, a learning approach is needed that can increase student learning activities which leads to an increase in students' higher-order thinking skills (HOTS). This research was conducted at State Junior High Schools in Marga Subdistrict, involving a sample of 78 students who were taken using a simple random sampling technique. The students' higher-order thinking skills (HOTS) were collected by using the test which has examined its validity and reliability coefficients. The collected data were analyzed using the t-test which has initially examined the normality of the data distribution and the homogeneity of the variants. The results of this study indicated that there was an effect of implementing a problem-based learning (PBL) approach on the students' higher-order thinking skills (HOTS).

1. Introduction

COVID-19 began to develop in Wuhan Province in China, with the first case was identified on December 12, 2019 (Lee, & Moon, 2020; Seulki, Jungwon, & Chongmin, 2020). The World Health Organization (WHO) stated that the corona virus (Covid-19) has spread to 213 countries and more than 3 million people have been confirmed positive and more than 200 thousand deaths all over the world (WHO, 2020). This pandemic has impacted on all aspects of human life, social, economic, and also education. Various policies and strategies have been carried out by the Indonesian government, such as social distancing, physical distancing, large-scale social restrictions, wearing masks, and washing hands frequently. In the field of Education, the United Nations Educational, Scientific and Cultural Organization (UNESCO) stated that the education system was limited, the teaching learning process was also limited, and more than 92% of educational institutions and universities were closed all over the world (UNESCO, 2020).

Meanwhile, from the diagnostic assessment was conducted by the Ministry of Education and Culture for primary and secondary education, it was obtained that the students already had signs of learning loss (Suprayitno, 2021). Learning loss is defined as the loss of learning ability and experience in students. Furthermore, 47 percent of schools/teachers stated that only 50 percent of students fulfilled competency standards. 20 percent of schools/teachers assessed that a small proportion of students fulfilled the competency standards. This meant that students who fulfilled competency standards were only under 50 percent. 31.9 percent of schools/teachers assessed that most of their students had fulfilled the competency standards. If most teachers/schools stated that their students did not fulfill the competency standards, it meant that there was a tendency that learning loss occurred (Suprayitno, 2021).

The phenomenon above indicated that the learning process was a challenge for teachers, how to design and identify the best approaches and solutions in learning during a pandemic (Saide & Sheng, 2020). New approaches and strategies are needed to carry out learning during the pandemic as well as after the pandemic. Distance learning was the best solution during a pandemic (Saide & Sheng, 2020) since many schools and colleges were closed. However, how distance learning could maintain students' learning activities even though studying at home was a challenge for teachers. Teachers were forced to reform the system or learning process that has been carried out, namely face-to-face learning towards online learning. Various obstacles faced by teachers and students in online learning, such as limited internet access (Khasanah, Pramudibyanto, & Widuroyekti, 2020), the lack of the parent's ability to

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facilitate learning (Obiakor & Adeniran, 2020), boring due to they merely stared at a laptop or cellphone, and identical with assignments (Livana, Mubin, and Basthomi, 2020). A learning approach is needed that can increase student learning activities, not merely giving textbook assignments. The learning should be based on students' daily life problems, it is problem-based learning (PBL).

PBL was first developed at the McMaster School of Medicine in Canada in 1965. Furthermore, it was refined by Howard in 1988 as a curriculum development strategy and a learning process approach (Samantha, Warelow, & Karen, 2009). PBL was well structured in learning, would require students to express or demonstrate a sharing of skills, such as independent learning, critical thinking, team participation, and critical knowledge acquisition (Levine, 2001). The process in PBL involved a systematic approach to solving problems or facing challenges following real-world situations (Charlton-Perez, 2013; Levine, 2001). Independent learning encouraged students to consider what they knew, what they didn't know, and what they might need to know to solve existing problems and similar contextual situations in the future (Samantha, Warelow, & Karen, 2009). In essence, PBL was a learning method approach that encouraged students to learn actively. In short, students work together to solve problems. In its implementation, they learn the skills needed to explore and solve complex problems (Goodman, 2008).

Various studies indicated the advantages of PBL over conventional learning approaches. PBL could improve students' high-order thinking skills (Krynock and Robb, 1996), learning outcomes (Achilles and Hoover, 1996), changed attitudes and self-confidence (McBroom and McBroom, 2001), and critical thinking skills (Gordon et al, 2001). The problem proposed in PBL was unstructured. It's a problem where there is no single proper solution, and when new information is collected, then the problem definition will change. The research by Luck and Norton (2004) about application of PBL online using asynchronous discussion boards and additional lecture videos. This study is compared student`s perspectives and experiences in online and face-to-face learning. It was found that students preferred online learning by PBL compared with face-to-face, even though there was no difference in learning results. Duncan, Smith, & Cook (2013) used a single module blended approach to knowing student`s experiences in online PBL learning. Each group of four people is given a problem scenario which is the core part of the module. The result is that online PBL seen useful for developing ideas and criticizing information.

Although online PBL has advantages over other online learning, such as the results of research by Luck & Norton (2004) and research by Duncan, Smith, & Cook (2013), it is not investigated how the effect of online PBL on students' higher order thinking skills. Even though high-order thinking skills for students are skills needed in the 21st century (Ramirez & Bell, 1994; Brookhart, 2010; Bellanca, 2013). If student`s abilities are not explored, the impact of online PBL for students will not be maximized (Savin-Baden, 2007) including student`s higher order thinking skills. This study adopts some advantages of PBL in online learning on higher-order thinking skills. Of course, there are some PBL principles that cannot be applied optimally. Physical meetings between teachers and students are limited when online classes so it doesn`t reduce student learning activities with the application of PBL. Therefore, the aim of this study is to examine the application of online PBL in its effect on student`s thinking abilities.

2. Method

This research was classified as quasi-experimental research which had a control group. However, it couldn't fully function to control the external variables that affected the implementation of the experiment. This study aimed to determine the differences in students' higher-order thinking skills with online PBL and conventional learning approaches conducted. In this experimental study, researchers used two sample groups with the design used was the Non-Equivalent Controll Group Design (Mahendra, 2019). This research was conducted on VIII grade students of State Junior High Schools in Marga Sub-district, which consisted of 4 schools involving SMPN 1 Marga, SMPN 2 Marga, SMPN3 Marga, and SMPN 4 Marga. This study involved a sample of 78 students who were taken by simple random sampling technique. The instrument used to collect the data was a higher-order thinking skill test that was compiled by the researcher, who had previously tested the validity and calculated the reliability coefficient. There were 7 items tested that were in the valid category and had a reliability coefficient of 0.78 of high category. Five items were used as the final test which was selected from seven items that had the highest validity coefficient for items measuring the same indicator. The collected data were then analyzed using the t-test, which had previously been tested for normality of data distribution and homogeneity of variance. Instrument analysis and data analysis using SPSS 20.0 for windows.

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3. Results and Discussion

The object of this research was the difference in students' higher-order thinking skills as a result of the learning approach. The form of the learning approach in this study was divided into two, namely the problem-based learning (PBL) and the conventional learning approach. This study used a non-equivalent control group design using the t-test as a means of analyzing data. Therefore, the data in this study were classified into high-order thinking skills of students who participated in the PBL and higher-order thinking skills of students who participated in conventional learning approaches. The results of the analysis of the central tendency (mean, mode, median) and the measures dispersion of the data distribution (variance and standard deviation) on the students' higher-order thinking skills scores could be figured in the following Table 1.

Table 1. Descriptive Statistic

		Y_1	Y_2
N	Valid	40	38
	Missing	0	2
Mean		73.3750	60.7368
Median		74.5000	60.0000
Mode		72.00[a]	54.00[a]
Std. Deviation		9.80499	9.64697
Variance		96.138	93.064
Range		47.00	47.00
Minimum		48.00	38.00
Maximum		95.00	85.00
Sum		2935.00	2308.00

a. Multiple modes exist. The smallest value is shown

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The normality test was carried out to ensure that the statistical test used in testing the hypothesis could be performed (Lomax, 1994). It's necessary when the data were not normally distributed, the t-test which was a parametric statistic couldn't be performed. The normality test in this study used the Kolmogorov-Smirnov in both groups of data on students' higher-order thinking skills.

Table 2. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Y_1	.134	38	.082	.963	38	.229
Y_2	.118	38	.200*	.956	38	.141

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The Kolmogorov-Smirnov and Shapiro-Wilk test analysis indicated that the sig. > 0.05 (Purnomo, 2016) for both data on higher-order thinking skills in the experimental group (Y_1) and the control group (Y_2) as in the table above. This meant that H_0 was accepted (failed to be rejected), both sample groups were normally distributed.

The variance homogeneity test was intended to ensure that the differences obtained from the t-test came from differences between groups, not due to differences within groups (Purnomo, 2016). Based on the results of the analysis of the variance homogeneity test using SPSS 16.0 for windows could be obtained the following results.

Table 3. Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
HOTS	Based on Mean	.001	1	76	.971
	Based on Median	.001	1	76	.983
	Based on Median and with adjusted df	.001	1	75.901	.983
	Based on trimmed mean	.001	1	76	.972

Based on the analysis results, the sig value Based on Mean was obtained > 0.05 or 0.971 > 0.05; that meant H_0 was accepted (Purnomo, 2016). It could be stated both groups came from populations that had the same or homogeneous variances. Thus, the data on students' higher-order thinking skills came from a homogeneous population. Based on the results of the prerequisite test, namely the normality test of data distribution and the homogeneity of variance test, it could be concluded that the data on students' high-order thinking skills came from a population that was normally distributed and had the same or homogeneous variance. Therefore, hypothesis testing with a t-test could be conducted.

The recapitulation of data analysis results using the t-test parametric statistics could be stated in the table below.

Table 4. Independent Samples t-test

Variances \ Statistic		F	Sig.	T	df	Sig. (2-tailed)
HOTS	Equal variances assumed	.001	.971	5.735	76	.0001
	Equal variances not assumed			5.737	75.9	.0001

The output above indicated that the significance value t calculated for the equal variances assumed for the two-tailed test was 0.001. It meant the sig. < 0.05 or 0.001 < 0.005. It could be concluded that H_0 was rejected and H_1 was accepted, in other words, there were differences in higher-order thinking skills between students who participated in the PBL and students who participated the conventional learning. The results of the data analysis also indicated that the group that followed the PBL approach had an average high-order thinking ability score of 73.3750, while the group of students who participated in the conventional learning had an average higher-order thinking skills score of 60.7368. Thus, the average higher-order thinking skills of the group of students who participated in the PBL were higher than the average of the higher-order thinking skills of the group of students who participated in conventional learning.

The results of data analysis using the t-test indicated that there were differences in higher-order thinking skills between students who participated in the PBL approach and students who participated in the conventional learning approach. This also indicated that the students' higher-order thinking skills could be reliable, it's necessary to improve the quality of learning, in this case, the learning approach used. The advantages of the PBL approach compared to conventional learning approaches can be seen from the average higher-order thinking skills of students, where the average higher-order thinking skills of the experimental group was 73.3750 higher than the average of higher-order thinking skills control of 60.7368.

The results of the data analysis indicated the advantages of the PBL approach compared to the conventional approach. This advantage is not only limited to theoretical descriptions but has been examined empirically in the field. In online PBL learning, every week students are asked to actively participate in learning, starting from finishing the assignments or problems given as well as oral presentations online through the zoom or google meet platform. In this learning process, students often had the opportunity to share the experience and knowledge, to motivate each other, and to train their communication skills (Wells, Warelow, & Jackson, 2009). The skills acquired by students were very important to support higher-order thinking skills, including future career development. This was in line with the statement of Duch, Groh, & Allen (2001) that PBL was a learning approach that challenged students to learn to face solutions to real-world problems. Based on this statement, students were required to use their thinking skills to face solutions to real problems that were given. Thus, indirectly, PBL plays a role in improving students' higher-level thinking skills.

Bloom's Taxonomy at the cognitive level was revised by Anderson and Krathwohl (2001) which was classified as higher-order thinking skills was to analyze (C4), evaluate (C5), and create (C6). Furthermore, it was stated by Anderson and Krathwohl (2001) that analyzing (C4) was the ability to solve problems by separating information into certain parts by identifying the causes, detecting interrelations and its whole to make conclusions and supporting evidence for generalizations consisting of differentiating. Evaluating (C5) was the ability to provide an assessment or defend an opinion to make decisions about information, the validity of ideas, or quality of work based on certain criteria and standards consisting of checking and critiquing. Create (C6) was the ability to organize information together in different ways by combining elements in a new pattern, product, or structure that was coherent and functional or creating alternative solutions that were different from the previous ones which included generating, planning, producing.

Through the PBL approach, students actively develop their thinking skills from C1 to C6. Through the analysis of real problems given, students were required to find out the logical relationships between the problems given and the concepts of the mathematical material given, to identify the elements that were known, were asked about a plan of their solution. Examples of some real problems given during the lesson:

"Look at the bicycle gear that is around you carefully. Investigate why the front gear is always bigger than the rear gear? What do you think if the size of the gear is the same or vice versa, the size of the front gear is bigger than the rear gear? Describe the results of your investigation, then present it!"

"*A motorcycle washing company employs 2 people every day. Try to predict based on logical reasons, what are the probability that a motorbike can be washed for 1 year? Describe your logical reasons, then present them at the next meeting* "

Through the real problems given above, students try to find out the answer by carrying out investigations and logical analysis. It takes the ability to think that is not merely memorization and memory, but the ability to analyze, evaluate, and create new solutions. After finding out solutions based on the real problems given, then students presented online the results obtained. Based on this activity, students learned to defend opinions, to counter argumentation, and to answer peers' questions. All of this required the ability to evaluate (C5). Meanwhile, the ability to create will be performed when students looked for various alternative solutions to solve existing problems. Based on the learning approaches above it was not surprising that the higher-level thinking skills of students who participated in the PBL approach were better than the higher-order thinking skills of students who participated in the conventional approach.

The results of this study are the same as other studies that indicate the PBL approach could improve the comprehension conceptual and problem solving (Kodariyati, & Astuti, 2016; Hastuti, Sahidu, & Gunawan, 2017), learning outcomes (Supiandi, Julung, 2016), learning motivation (Amiluddin, & Sugiman, 2016), as well as the ability to think critically (Karmana, Dharmawibawa, & Hajiriah, 2020). Online PBL can develop skills related to employability, searching / evaluating information, developing ideas, criticizing information (Duncan, Smith, & Cook, 2013).

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4. Conclusion

The results of this study indicated that there were differences in students' higher-order thinking skills between the students who participated in the PBL approach and the students who participated in the conventional approach. In other words, it could be concluded that there was an effect of the implementation of the PBL approach on students' higher-order thinking skills. Therefore, it is recommended for teachers to implement the PBL approach in mathematics lessons and also in other subjects during the Covid-19 pandemic. The variable of students' high-order thinking skills in this study is expected to other researchers for examine other variables and involve a larger sample.

5. References

Achilles, C. M. & Hoover, S. P. (1996). *Exploring problem-based learning (PBL) in grades 6-12. Paper presented at the Annual Meeting of the Mid-South Educational Research Association, Tuscaloosa*, AL. USA. https://files.eric.ed.gov/fulltext/ED406406.pdf.

Amiluddin, R., & Sugiman, S. (2016). Pengaruh problem posing dan PBL terhadap prestasi belajar, dan motivasi belajar mahasiswa pendidikan matematika. Jurnal Riset Pendidikan Matematika, 3(1), 100-108. https://doi.org/10.21831/jrpm.v3i1.7303

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing*. New York: Longman.

Brookhart, S. M. (2010). *How to assess higher-order thinking skills in your classroom*. ASCD. http://mpi.uinsgd.ac.id/wp-content/uploads/2018/07/Susan-M.-Brookhart-How-to-Assess-Higher-Order-Thinking-Skills-in-Your-Classroom-Association-for-Supervision-Curriculum-Development-2010.pdf

Charlton-Perez, A. J. (2013). *Problem-Based Learning Approaches in Meteorology. Journal of Geoscience Education, 61(1), 12–19.* doi:10.5408/11-281.1

Duch, B. J., Groh, S. E. & Allen, D. E. (2001). *The power of problem-based learning*, Sterling, VA: Stylus.

Duncan, M. J., Smith, M., & Cook, K. (2013). *Implementing online problem-based learning (PBL) in postgraduates new to both online learning and PBL: An example from strength and conditioning.* Journal of Hospitality, Leisure, Sport & Tourism Education, 12(1), 79–84. doi: 10.1016/j.jhlste.2012.11.004

Goodman, D. (2008). *Problem-based Learning in the MPA Curriculum.* Journal of Public Affairs Education, 14(2), 253–270. doi:10.1080/15236803.2008.12001523

Gordon P. R., Rogers, A. M., Comfort, M., Gavula, N., and Mcgee, B, P. (2001). *A taste of problem-based learning increases achievement of urban minority middle-school students*. Educational Horizons, 79, 171-175. http://www.jstor.org/stable/42927061

Hastuti, A., Sahidu, H., & Gunawan, G. (2017). Pengaruh Model PBL Berbantuan Media Virtual Tehadap Kemampuan Pemecahan Masalah Fisika. Jurnal Pendidikan Fisika dan Teknologi, 2(3), 129-135. https://jurnalfkip.unram.ac.id/index.php/JPFT/article/view/303/296

Karmana, I. W., Dharmawibawa, I. D., & Hajiriah, T. L. (2020). Efektivitas Strategi PBL Berbasis Potensi Akademik Terhadap Keterampilan Pemecahan Masalah dan Berpikir Kritis Siswa SMA Pada Topik Lingkungan. Jurnal Ilmiah Mandala Education, 6(1). http://ejournal.mandalanursa.org/index.php/JIME/article/view/1002/1053

Khasanah, D. R. A. U., Pramudibyanto, H., & Widuroyekti, B. (2020). Pendidikan Dalam Masa Pandemi Covid-19. Jurnal Sinestesia, 10(1), 41–48. https://sinestesia.pustaka.my.id/journal/article/view/44/6

Kodariyati, L., & Astuti, B. (2016). Pengaruh model PBL terhadap kemampuankomunikasi dan pemecahan masalah matematika siswa kelas V SD. Jurnal Prima Edukasia, 4(1), 93-106. http://staffnew.uny.ac.id/upload/132319829/penelitian/2016%20pengaruh%20model%20PBL.pdf

Krynock, K. B. and Robb, L. (1996). *Is problem-based learning a problem for your curriculum?* Illinois School Research and Development Journal, 33, 21-24.

Lee, S., Hwang, C., & Moon, M. J. (2020). *Policy learning and crisis policy-making: quadruple-loop learning and COVID-19 responses in South Korea. Policy and Society, 119.* doi:10.1080/14494035.2020.1785195.

Levine, A. (2001). *Problem based learning, Maricopa Centre for learning and instruction*. from www.mcli. Accessed 24 March 2021.

Livana, P.H., Mubin, M.F., dan Basthomi, Z. (2020). "Tugas Pembelajaran" Penyebab Stres Mahasiswa Selama Pandemi Covid-1. Jurnal Ilmu Keperawatan Jiwa, 3(2), 203-208. https://doi.org/10.32584/jikj.v3i2.590

Luck, P., & Norton, B. (2004). Problem based management learning better online? European Journal of Open and Distance Learning, Accessed May, 2021. https://old.eurodl.org/?p=archives&year=2004&halfyear=2&article=156

Mahendra, I., Parmithi, N. N., Suana, I. W., & Sumandya, I. W. (2019). *Developing Hots Through Performance*. International Journal of Scientific & Technology Research, 8(11), 3004-3007. http://www.ijstr.org/final-print/dec2019/-Developing-Hots-Through-Performance-Assessment-.pdf

McBroom, D. G. and McBroom, W. H. (2001). *Teaching molecular genetics to secondary students: an illustration and evaluation using problem-based learning*. Problem Log, 6, 2-4.

Purnomo, R. A. (2016). Analisis Statistik Ekonomi dan Bisnis. Ponorogo: WADE Group.

Ramirez, R., & Bell, R. (1994). Byting back: Policies to support the use oftedmology in education. Oak Brook, IL: North Central Regional Educational Laboratory. https://files.eric.ed.gov/fulltext/ED378941.pdf

Ramirez, R., & Bell, R. (1994). *Byting back: Policies to support the use oftedmology in education. Oak Brook, IL: North Central Regional Educational Laboratory*. https://files.eric.ed.gov/fulltext/ED378941.pdf

Saide, S., & Sheng, M. L. (2020). *Knowledge exploration–exploitation and information technology: crisis management of teaching–learning scenario in the COVID-19 outbreak. Technology Analysis & Strategic Management, 1-16.* doi:10. 1080/09537 325 .2020.1854714

Samantha Wells, Philip Warelow & Karen Jackson. (2009). *Problem based learning* (PBL): A conundrum, Contemporary Nurse, 33:2, 191-201, DOI: 10.5172/conu.2009.33.2.191

Savin-Baden, M. (2007). A practical guide to problem-based learning online. London: Routledge.

Seulki, L., Jungwon, Y., & Chongmin, N. (2020). *Learning before and during the COVID-19 outbreak: a comparative analysis of crisis learning in South Korea and the US*, International Review of Public Administration, DOI: 10.1080/12294659.2020.185 2715.

Supiandi, M. I., & Julung, H. (2016). Pengaruh model problem-based learning (PBL) terhadap kemampuan memecahkan masalah dan hasil belajar kognitif siswa biologi SMA. Jurnal Pendidikan Sains, 4(2), 60-64. http://journal.um.ac.id/index.php/jps/article/view/8183/3736

Suprayitno, T. (2021). Kemendikbud: Tanda Learning Lost Sudah Mulai Tampak. https://www.republika.co.id/berita/qna3kh428/kemendikbud-tanda-emlearning-lostem-sudah-mulai-tampak. Diakses tanggal 25 Januari 2021.

UNESCO. (2020). *COVID-19 Impact on Education. UNESCO*. https://en.unesco.org/covid19/ educationresponse. Diakses tanggal 20 April 2021.

Wells, S., Warelow, P., & Jackson, K. (2009). *Problem based learning (PBL): A conundrum. Contemporary Nurse, 33(2), 191–201.* doi:10.5172/conu.2009.33.2.191

World Health Organization. (2020). April 28. *Coronavirus Disease 2019 (COVID-19*). Situation Report-99. World Health Organization. https://www.who.int/emergencies/diseases/novel-coronavirus-2019?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQjwhr2FBhDbARIsACjwLo0q1d9x_jRm4CuFRjkt0xZnIGPmI7F3v89d2KInookjpxv_F45Z9IsaAgheEALw_wcB.

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PROBLEM-BASED LEARNING: LEARNING APPROACH SOLUTIONS IN CRISIS PERIOD

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The background of this study was the poorly of learning activity by using a conventional approach during the Covid-19 pandemic. Moreover, it is presumed that the learning loss has occurred. Therefore, a learning approach is needed that can increase student learning activities which leads to an increase in students' higher-order thinking skills (HOTS). This research was conducted at State Junior High Schools in Marga Subdistrict, involving a sample of 78 students who were taken using a simple random sampling technique. The students' higher-order thinking skills (HOTS) were collected by using the test which has examined its validity and reliability coefficients. The collected data were analyzed using the t-test which has initially examined the normality of the data distribution and the homogeneity of the variants. The results of this study indicated that there was an effect of implementing a problem-based learning (PBL) approach on the students' higher-order thinking skills (HOTS).

1. Introduction

COVID-19 began to develop in Wuhan Province in China, with the first case was identified on December 12, 2019 (Lee, & Moon, 2020; Seulki, Jungwon, & Chongmin, 2020). The World Health Organization (WHO) stated that the corona virus (Covid-19) has spread to 213 countries and more than 3 million people have been confirmed positive and more than 200 thousand deaths all over the world (WHO, 2020). This pandemic has impacted on all aspects of human life, social, economic, and also education. Various policies and strategies have been carried out by the Indonesian government, such as social distancing, physical distancing, large-scale social restrictions, wearing masks, and washing hands frequently. In the field of Education, the United Nations Educational, Scientific and Cultural Organization (UNESCO) stated that the education system was limited, the teaching learning process was also limited, and more than 92% of educational institutions and universities were closed all over the world (UNESCO, 2020).

Meanwhile, from the diagnostic assessment was conducted by the Ministry of Education and Culture for primary and secondary education, it was obtained that the students already had signs of learning loss (Suprayitno, 2021). Learning loss is defined as the loss of learning ability and experience in students. Furthermore, 47 percent of schools/teachers stated that only 50 percent of students fulfilled competency standards. 20 percent of schools/teachers assessed that a small proportion of students fulfilled the competency standards. This meant that students who fulfilled competency standards were only under 50 percent. 31.9 percent of schools/teachers assessed that most of their students had fulfilled the competency standards. If most teachers/schools stated that their students did not fulfill the competency standards, it meant that there was a tendency that learning loss occurred (Suprayitno, 2021).

The phenomenon above indicated that the learning process was a challenge for teachers, how to design and identify the best approaches and solutions in learning during a pandemic (Saide & Sheng, 2020). New approaches and strategies are needed to carry out learning during the pandemic as well as after the pandemic. Distance learning was the best solution during a pandemic (Saide & Sheng, 2020) since many schools and colleges were closed. However, how distance learning could maintain students' learning activities even though studying at home was a challenge for teachers. Teachers were forced to reform the system or learning process that has been carried out, namely face-to-face learning towards online learning. Various obstacles faced by teachers and students in online learning, such as limited internet access (Khasanah, Pramudibyanto, & Widuroyekti, 2020), the lack of the parent's ability to

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facilitate learning (Obiakor & Adeniran, 2020), boring due to they merely stared at a laptop or cellphone, and identical with assignments (Livana, Mubin, and Basthomi, 2020). A learning approach is needed that can increase student learning activities, not merely giving textbook assignments. The learning should be based on students' daily life problems, it is problem-based learning (PBL).

PBL was first developed at the McMaster School of Medicine in Canada in 1965. Furthermore, it was refined by Howard in 1988 as a curriculum development strategy and a learning process approach (Samantha, Warelow, & Karen, 2009). PBL was well structured in learning, would require students to express or demonstrate a sharing of skills, such as independent learning, critical thinking, team participation, and critical knowledge acquisition (Levine, 2001). The process in PBL involved a systematic approach to solving problems or facing challenges following real-world situations (Charlton-Perez, 2013; Levine, 2001). Independent learning encouraged students to consider what they knew, what they didn't know, and what they might need to know to solve existing problems and similar contextual situations in the future (Samantha, Warelow, & Karen, 2009). In essence, PBL was a learning method approach that encouraged students to learn actively. In short, students work together to solve problems. In its implementation, they learn the skills needed to explore and solve complex problems (Goodman, 2008).

Various studies indicated the advantages of PBL over conventional learning approaches. PBL could improve students' high-order thinking skills (Krynock and Robb, 1996), learning outcomes (Achilles and Hoover, 1996), changed attitudes and self-confidence (McBroom and McBroom, 2001), and critical thinking skills (Gordon et al, 2001). The problem proposed in PBL was unstructured. It's a problem where there is no single proper solution, and when new information is collected, then the problem definition will change. The research by Luck and Norton (2004) about application of PBL online using asynchronous discussion boards and additional lecture videos. This study is compared student`s perspectives and experiences in online and face-to-face learning. It was found that students preferred online learning by PBL compared with face-to-face, even though there was no difference in learning results. Duncan, Smith, & Cook (2013) used a single module blended approach to knowing student`s experiences in online PBL learning. Each group of four people is given a problem scenario which is the core part of the module. The result is that online PBL seen useful for developing ideas and criticizing information.

Although online PBL has advantages over other online learning, such as the results of research by Luck & Norton (2004) and research by Duncan, Smith, & Cook (2013), it is not investigated how the effect of online PBL on students' higher order thinking skills. Even though high-order thinking skills for students are skills needed in the 21st century (Ramirez & Bell, 1994; Brookhart, 2010; Bellanca, 2013). If student`s abilities are not explored, the impact of online PBL for students will not be maximized (Savin-Baden, 2007) including student`s higher order thinking skills. This study adopts some advantages of PBL in online learning on higher-order thinking skills. Of course, there are some PBL principles that cannot be applied optimally. Physical meetings between teachers and students are limited when online classes so it doesn`t reduce student learning activities with the application of PBL. Therefore, the aim of this study is to examine the application of online PBL in its effect on student`s thinking abilities.

2. Method

This research was classified as quasi-experimental research which had a control group. However, it couldn't fully function to control the external variables that affected the implementation of the experiment. This study aimed to determine the differences in students' higher-order thinking skills with online PBL and conventional learning approaches conducted. In this experimental study, researchers used two sample groups with the design used was the Non-Equivalent Controll Group Design (Mahendra, 2019). This research was conducted on VIII grade students of State Junior High Schools in Marga Sub-district, which consisted of 4 schools involving SMPN 1 Marga, SMPN 2 Marga, SMPN3 Marga, and SMPN 4 Marga. This study involved a sample of 78 students who were taken by simple random sampling technique. The instrument used to collect the data was a higher-order thinking skill test that was compiled by the researcher, With indicators 1) Analyzing (C4) includes: comparing, making diagrams, and describing, 2) evaluating (C5) including: checking back, giving arguments, and concluding, 3) Creating (C6) includes: designing, creating, designing, and who had previously tested the validity and calculated the reliability coefficient. There were 7 items tested that were in the valid category and had a reliability coefficient of 0.78 of high category. Five items were used as the final test which was selected from seven items that had the highest validity coefficient for items measuring the same indicator. The collected data were then analyzed using the t-test, which had previously been tested for normality of data distribution and homogeneity of variance. Instrument analysis and data analysis using SPSS 20.0 for windows.

3. Results and Discussion

The object of this research was the difference in students' higher-order thinking skills as a result of the learning approach. The form of the learning approach in this study was divided into two, namely the problem-based learning (PBL) and the conventional learning approach. This study used a non-equivalent control group design using the t-test as a means of analyzing data. Therefore, the data in this study were classified into high-order thinking skills of students who participated in the PBL and higher-order thinking skills of students who participated in conventional learning approaches. The results of the analysis of the central tendency (mean, mode, median) and the measures dispersion of the data distribution (variance and standard deviation) on the students' higher-order thinking skills scores could be figured in the following Table 1.

Table 1. Descriptive

Statistic	Experimental Group	Group
Sample	40	38
Mean	73.3750	60.7368
Median	74.5000	60.0000
Mode	72.00[a]	54.00[a]
Std. Deviation	9.80499	9.64697
Variance	96.138	93.064
Range	47.00	47.00
Minimum	48.00	38.00
Maximum	95.00	85.00
Sum	2935.00	2308.00

The normality test was carried out to ensure that the statistical test used in testing the hypothesis could be performed (Lomax, 1994). It's necessary when the data were not normally distributed, the t-test which was a parametric statistic couldn't be performed. The normality test in this study used the Kolmogorov-Smirnov in both groups of data on students' higher-order thinking skills.

Table 2. Tests of Normality

Group	Statistic	df	Sig.
Experimental	0.134	38	0.082
Control	0.118	38	0.200*

The Kolmogorov-Smirnov and Shapiro-Wilk test analysis indicated that the sig. > 0.05 (Purnomo, 2016) for both data on higher-order thinking skills in the experimental group (Y_1) and the control group (Y_2) as in the table above. This meant that H_0 was accepted (failed to be rejected), both sample groups were normally distributed.

The variance homogeneity test was intended to ensure that the differences obtained from the t-test came from differences between groups, not due to differences within groups (Purnomo, 2016). Based on the results of the analysis of the variance homogeneity test using SPSS 16.0 for windows could be obtained the following results.

Table 3. Test of Homogeneity of Variances

Variances	Levene Statistic	df1	df2	Sig.
Based on Mean	0.001	1	76	0.971
Based on Median	0.001	1	76	0.983
Based on Median and with adjusted df	0.001	1	75.901	0.983
Based on trimmed mean	0.001	1	76	0.972

Based on the analysis results, the sig value Based on Mean was obtained > 0.05 or 0.971 > 0.05; that meant H_0 was accepted (Purnomo, 2016). It could be stated both groups came from populations that had the same or homogeneous variances. Thus, the data on students' higher-order thinking skills came

from a homogeneous population. Based on the results of the prerequisite test, namely the normality test of data distribution and the homogeneity of variance test, it could be concluded that the data on students' high-order thinking skills came from a population that was normally distributed and had the same or homogeneous variance. Therefore, hypothesis testing with a t-test could be conducted.

The recapitulation of data analysis results using the t-test parametric statistics could be stated in the table below.

Table 4. Independent Samples t-test

Variances	Statistic		
	t	df	Sig.
Equal variances assumed	5.735	76	0.0001
Equal variances not assumed	5.737	75.9	0.0001

The output above indicated that the significance value t calculated for the equal variances assumed for the two-tailed test was 0.001. It meant the sig. < 0.05 or 0.001 < 0.005. It could be concluded that H_0 was rejected and H_1 was accepted, in other words, there were differences in higher-order thinking skills between students who participated in the PBL and students who participated the conventional learning. The results of the data analysis also indicated that the group that followed the PBL approach had an average high-order thinking ability score of 73.3750, while the group of students who participated in the conventional learning had an average higher-order thinking skills score of 60.7368. Thus, the average higher-order thinking skills of the group of students who participated in the PBL were higher than the average of the higher-order thinking skills of the group of students who participated in conventional learning.

The results of data analysis using the t-test indicated that there were differences in higher-order thinking skills between students who participated in the PBL approach and students who participated in the conventional learning approach. This also indicated that the students' higher-order thinking skills could be reliable, it's necessary to improve the quality of learning, in this case, the learning approach used. The advantages of the PBL approach compared to conventional learning approaches can be seen from the average higher-order thinking skills of students, where the average higher-order thinking skills of the experimental group was 73.3750 higher than the average of higher-order thinking skills control of 60.7368.

The results of the data analysis indicated the advantages of the PBL approach compared to the conventional approach. This advantage is not only limited to theoretical descriptions but has been examined empirically in the field. In online PBL learning, every week students are asked to actively participate in learning, starting from finishing the assignments or problems given as well as oral presentations online through the zoom or google meet platform. In this learning process, students often had the opportunity to share the experience and knowledge, to motivate each other, and to train their communication skills (Wells, Warelow, & Jackson, 2009). The skills acquired by students were very important to support higher-order thinking skills, including future career development. This was in line with the statement of Duch, Groh, & Allen (2001) that PBL was a learning approach that challenged students to learn to face solutions to real-world problems. Based on this statement, students were required to use their thinking skills to face solutions to real problems that were given. Thus, indirectly, PBL plays a role in improving students' higher-level thinking skills.

Bloom's Taxonomy at the cognitive level was revised by Anderson and Krathwohl (2001) which was classified as higher-order thinking skills was to analyze (C4), evaluate (C5), and create (C6). Furthermore, it was stated by Anderson and Krathwohl (2001) that analyzing (C4) was the ability to solve problems by separating information into certain parts by identifying the causes, detecting interrelations and its whole to make conclusions and supporting evidence for generalizations consisting of differentiating. Evaluating (C5) was the ability to provide an assessment or defend an opinion to make decisions about information, the validity of ideas, or quality of work based on certain criteria and standards consisting of checking and critiquing. Create (C6) was the ability to organize information together in different ways by combining elements in a new pattern, product, or structure that was coherent and functional or creating alternative solutions that were different from the previous ones which included generating, planning, producing.

Through the PBL approach, students actively develop their thinking skills from C1 to C6. Through the analysis of real problems given, students were required to find out the logical relationships between the problems given and the concepts of the mathematical material given, to identify the elements that

were known, were asked about a plan of their solution. Examples of some real problems given during the lesson:

"Look at the bicycle gear that is around you carefully. Investigate why the front gear is always bigger than the rear gear? What do you think if the size of the gear is the same or vice versa, the size of the front gear is bigger than the rear gear? Describe the results of your investigation, then present it!"

"*A motorcycle washing company employs 2 people every day. Try to predict based on logical reasons, what are the probability that a motorbike can be washed for 1 year? Describe your logical reasons, then present them at the next meeting* "

Through the real problems given above, students try to find out the answer by carrying out investigations and logical analysis. It takes the ability to think that is not merely memorization and memory, but the ability to analyze, evaluate, and create new solutions. After finding out solutions based on the real problems given, then students presented online the results obtained. Based on this activity, students learned to defend opinions, to counter argumentation, and to answer peers' questions. All of this required the ability to evaluate (C5). Meanwhile, the ability to create will be performed when students looked for various alternative solutions to solve existing problems. Based on the learning approaches above it was not surprising that the higher-level thinking skills of students who participated in the PBL approach were better than the higher-order thinking skills of students who participated in the conventional approach.

The results of this study are the same as other studies that indicate the PBL approach could improve the comprehension conceptual and problem solving (Kodariyati, & Astuti, 2016; Hastuti, Sahidu, & Gunawan, 2017), learning outcomes (Supiandi, Julung, 2016), learning motivation (Amiluddin, & Sugiman, 2016), as well as the ability to think critically (Karmana, Dharmawibawa, & Hajiriah, 2020). Online PBL can develop skills related to employability, searching/evaluating information, developing ideas, criticizing information (Duncan, Smith, & Cook, 2013). The results of this study indicate the superiority of PBL over conventional learning in its effect on students' higher order thinking skills. PBL is significantly more effective than conventional learning in improving students' higher order thinking skills during the learning process. PBL instruction was effective when it came to long-term retention and performance improvement. PBL students were overall slightly underperforming when it came to shortterm retention.

4. Conclusion

The results of this study indicated that there were differences in students' higher-order thinking skills between the students who participated in the PBL approach and the students who participated in the conventional approach. In other words, it could be concluded that there was an effect of the implementation of the PBL approach on students' higher-order thinking skills. Therefore, it is recommended for teachers to implement the PBL approach in mathematics lessons and also in other subjects during the Covid-19 pandemic. The variable of students' high-order thinking skills in this study is expected to other researchers for examine other variables and involve a larger sample.

5. References

Achilles, C. M. & Hoover, S. P. (1996). *Exploring problem-based learning (PBL) in grades 6-12. Paper presented at the Annual Meeting of the Mid-South Educational Research Association, Tuscaloosa*, AL. USA. https://files.eric.ed.gov/fulltext/ED406406.pdf.

Amiluddin, R., & Sugiman, S. (2016). Pengaruh problem posing dan PBL terhadap prestasi belajar, dan motivasi belajar mahasiswa pendidikan matematika. Jurnal Riset Pendidikan Matematika, 3(1), 100-108. https://doi.org/10.21831/jrpm.v3i1.7303

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing*. New York: Longman.

Brookhart, S. M. (2010). *How to assess higher-order thinking skills in your classroom*. ASCD. http://mpi.uinsgd.ac.id/wp-content/uploads/2018/07/Susan-M.-Brookhart-How-to-Assess-Higher-Order-Thinking-Skills-in-Your-Classroom-Association-for-Supervision-Curriculum-Development-2010.pdf

Charlton-Perez, A. J. (2013). *Problem-Based Learning Approaches in Meteorology. Journal of Geoscience Education, 61(1), 12–19.* doi:10.5408/11-281.1

Duch, B. J., Groh, S. E. & Allen, D. E. (2001). *The power of problem-based learning*, Sterling, VA: Stylus.

Duncan, M. J., Smith, M., & Cook, K. (2013). *Implementing online problem-based learning (PBL) in postgraduates new to both online learning and PBL: An example from strength and conditioning.* Journal of Hospitality, Leisure, Sport & Tourism Education, 12(1), 79–84. doi: 10.1016/j.jhlste.2012.11.004

Goodman, D. (2008). *Problem-based Learning in the MPA Curriculum.* Journal of Public Affairs Education, 14(2), 253–270. doi:10.1080/15236803.2008.12001523

Gordon P. R., Rogers, A. M., Comfort, M., Gavula, N., and Mcgee, B, P. (2001). *A taste of problem-based learning increases achievement of urban minority middle-school students*. Educational Horizons, 79, 171-175. http://www.jstor.org/stable/42927061

Hastuti, A., Sahidu, H., & Gunawan, G. (2017). Pengaruh Model PBL Berbantuan Media Virtual Tehadap Kemampuan Pemecahan Masalah Fisika. Jurnal Pendidikan Fisika dan Teknologi, 2(3), 129-135. https://jurnalfkip.unram.ac.id/index.php/JPFT/article/view/303/296

Karmana, I. W., Dharmawibawa, I. D., & Hajiriah, T. L. (2020). Efektivitas Strategi PBL Berbasis Potensi Akademik Terhadap Keterampilan Pemecahan Masalah dan Berpikir Kritis Siswa SMA Pada Topik Lingkungan. Jurnal Ilmiah Mandala Education, 6(1). http://ejournal.mandalanursa.org/index.php/JIME/article/view/1002/1053

Khasanah, D. R. A. U., Pramudibyanto, H., & Widuroyekti, B. (2020). Pendidikan Dalam Masa Pandemi Covid-19. Jurnal Sinestesia, 10(1), 41–48. https://sinestesia.pustaka.my.id/journal/article/view/44/6

Kodariyati, L., & Astuti, B. (2016). Pengaruh model PBL terhadap kemampuankomunikasi dan pemecahan masalah matematika siswa kelas V SD. Jurnal Prima Edukasia, 4(1), 93-106. http://staffnew.uny.ac.id/upload/132319829/penelitian/2016%20pengaruh%20model%20PBL.pdf

Krynock, K. B. and Robb, L. (1996). *Is problem-based learning a problem for your curriculum?* Illinois School Research and Development Journal, 33, 21-24.

Lee, S., Hwang, C., & Moon, M. J. (2020). *Policy learning and crisis policy-making: quadruple-loop learning and COVID-19 responses in South Korea. Policy and Society, 119.* doi:10.1080/14494035.2020.1785195.

Levine, A. (2001). *Problem based learning, Maricopa Centre for learning and instruction*. from www.mcli. Accessed 24 March 2021.

Livana, P.H., Mubin, M.F., dan Basthomi, Z. (2020). "Tugas Pembelajaran" Penyebab Stres Mahasiswa Selama Pandemi Covid-1. Jurnal Ilmu Keperawatan Jiwa, 3(2), 203-208. https://doi.org/10.32584/jikj.v3i2.590

Luck, P., & Norton, B. (2004). Problem based management learning better online? European Journal of Open and Distance Learning, Accessed May, 2021. https://old.eurodl.org/?p=archives&year=2004&halfyear=2&article=156

Mahendra, I., Parmithi, N. N., Suana, I. W., & Sumandya, I. W. (2019). *Developing Hots Through Performance*. International Journal of Scientific & Technology Research, 8(11), 3004-3007. http://www.ijstr.org/final-print/dec2019/-Developing-Hots-Through-Performance-Assessment-.pdf

McBroom, D. G. and McBroom, W. H. (2001). *Teaching molecular genetics to secondary students: an illustration and evaluation using problem-based learning*. Problem Log, 6, 2-4.

Purnomo, R. A. (2016). Analisis Statistik Ekonomi dan Bisnis. Ponorogo: WADE Group.

Ramirez, R., & Bell, R. (1994). Byting back: Policies to support the use oftedmology in education. Oak Brook, IL: North Central Regional Educational Laboratory. https://files.eric.ed.gov/fulltext/ED378941.pdf

Ramirez, R., & Bell, R. (1994). *Byting back: Policies to support the use oftedmology in education. Oak Brook, IL: North Central Regional Educational Laboratory*. https://files.eric.ed.gov/fulltext/ED378941.pdf

Saide, S., & Sheng, M. L. (2020). *Knowledge exploration–exploitation and information technology: crisis management of teaching–learning scenario in the COVID-19 outbreak. Technology Analysis & Strategic Management, 1-16.* doi:10. 1080/09537 325 .2020.1854714

Samantha Wells, Philip Warelow & Karen Jackson. (2009). *Problem based learning* (PBL): A conundrum, Contemporary Nurse, 33:2, 191-201, DOI: 10.5172/conu.2009.33.2.191

Savin-Baden, M. (2007). A practical guide to problem-based learning online. London: Routledge.

Seulki, L., Jungwon, Y., & Chongmin, N. (2020). *Learning before and during the COVID-19 outbreak: a comparative analysis of crisis learning in South Korea and the US*, International Review of Public Administration, DOI: 10.1080/12294659.2020.185 2715.

Supiandi, M. I., & Julung, H. (2016). Pengaruh model problem-based learning (PBL) terhadap kemampuan memecahkan masalah dan hasil belajar kognitif siswa biologi SMA. Jurnal Pendidikan Sains, 4(2), 60-64. http://journal.um.ac.id/index.php/jps/article/view/8183/3736

Suprayitno, T. (2021). Kemendikbud: Tanda Learning Lost Sudah Mulai Tampak. https://www.republika.co.id/berita/qna3kh428/kemendikbud-tanda-emlearning-lostem-sudah-mulai-tampak. Diakses tanggal 25 Januari 2021.

UNESCO. (2020). *COVID-19 Impact on Education. UNESCO*. https://en.unesco.org/covid19/ educationresponse. Diakses tanggal 20 April 2021.

Wells, S., Warelow, P., & Jackson, K. (2009). *Problem based learning (PBL): A conundrum. Contemporary Nurse, 33(2), 191–201.* doi:10.5172/conu.2009.33.2.191

World Health Organization. (2020). April 28. *Coronavirus Disease 2019 (COVID-19*). Situation Report-99. World Health Organization. https://www.who.int/emergencies/diseases/novel-coronavirus-2019?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQjwhr2FBhDbARIsACjwLo0q1d9x_jRm4CuFRjkt0xZnIGPmI7F3v89d2KInookjpxv_F45Z9IsaAgheEALw_wcB.