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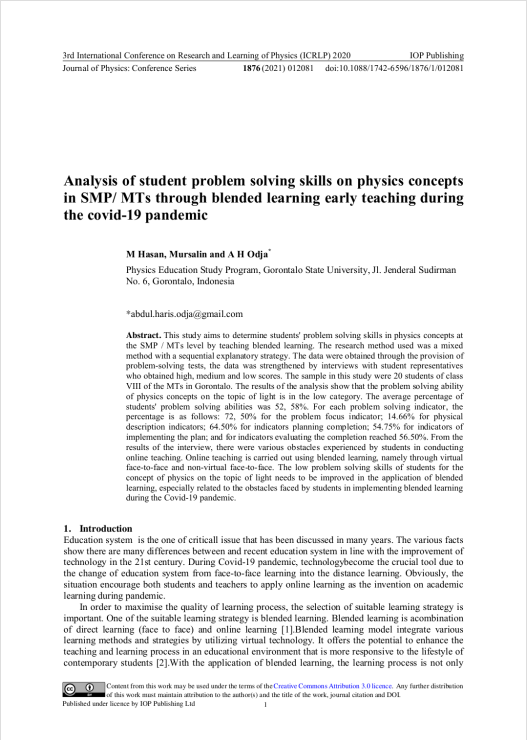

Analysis of student problem solving skills on physics concepts in SMP/ MTs through blended learning early teaching during the covid-19 pandemic

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Abstract. This study aims to determine students' problem solving skills in physics concepts at the SMP / MTs level by teaching blended learning. The research method used was a mixed method with a sequential explanatory strategy. The data were obtained through the provision of problem-solving tests, the data was strengthened by interviews with student representatives who obtained high, medium and low scores. The sample in this study were 20 students of class VIII of the MTs in Gorontalo. The results of the analysis show that the problem solving ability of physics concepts on the topic of light is in the low category. The average percentage of students' problem solving abilities was 52, 58%. For each problem solving indicator, the percentage is as follows: 72, 50% for the problem focus indicator; 14.66% for physical description indicators; 64.50% for indicators planning completion; 54.75% for indicators of implementing the plan; and for indicators evaluating the completion reached 56.50%. From the results of the interview, there were various obstacles experienced by students in conducting online teaching. Online teaching is carried out using blended learning, namely through virtual face-to-face and non-virtual face-to-face. The low problem solving skills of students for the concept of physics on the topic of light needs to be improved in the application of blended learning, especially related to the obstacles faced by students in implementing blended learning during the Covid-19 pandemic.

1. Introduction

Education system is the one of criticall issue that has been discussed in many years. The various facts show there are many differences between and recent education system in line with the improvement of technology in the 21st century. During Covid-19 pandemic, technologybecome the crucial tool due to the change of education system from face-to-face learning into the distance learning. Obviously, the situation encourage both students and teachers to apply online learning as the invention on academic learning during pandemic.

In order to maximise the quality of learning process, the selection of suitable learning strategy is important. One of the suitable learning strategy is blended learning. Blended learning is acombination of direct learning (face to face) and online learning [1].Blended learning model integrate various learning methods and strategies by utilizing virtual technology. It offers the potential to enhance the teaching and learning process in an educational environment that is more responsive to the lifestyle of contemporary students [2].With the application of blended learning, the learning process is not only

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face-to-face, but can also take place outside face to face. So thatstudents have more time and space to communicate to improve mastery of learning material, especially in learning physics.

In another perspective, blended learning techniques also have other advantages in online learning. For instance helping students to be able to learn independently, where students can express themselves looking for information without having to face the teacher [3].In addition, students can learn according to their respective learning speed without being influenced by their friends [4].Thus, this is in line with how to help students improve problem solving skills. Where to improve learning outcomes, especially related to student problem solving skills, it needs to be supported by appropriate learning strategies. With the use of technology, the application of blended learning has the potential to provide innovation in solving physics problems.

Problem solving skills are a skill or potential to solve problems in student's itself and can be applied in everyday life [5]. Physics is a subject that is closely related to problem solving. One of the physics topics that require problem solving skills is the topic of light.

In the learning process, it was found that students were still less able to complete problem-solving tests. Low problem solving skills are caused by several factors, including science learning which is more oriented towards textbooks and more traditional laboratory activities [6]. To improve problem solving skills faced by students in learning physics can be done by providing strategies for how to solve these problems. One way that can be done is to use a problem-solving strategy developed by Heller, et, al. believe that the problem solving stage consists of five indicators, namely; (1) focusing on the problem, (2) describing it physically, (3) planning the solution, (4) implementing the solution plan, and (5) evaluating the solution [7]. Based on the explanation above, this study aims to determine the concept of problem-solving skills in physics at SMP / MTs with blended learning teaching.

2. Research Method

The methodology of the research is mixed method, which is a combination of qualitative and quantitative methods. The type of combination research uses sequential explanatory strategy.The sequential explanatory strategy is a strategy applied by collecting and analyzing quantitative data and analyzing qualitative data. The instrument used in this study is a problem-solving test designed to determine problem solving based on the problem-solving strategy developed by Heller, et.al.In this study, the research subject was the result of the answer to the problem solving skills of class VIII students at one of the MTs in Gorontalo. Students' answers are categorized and analyzed based on indicator strategies and problem solving scoring guidelines. The guidelines for giving problem solving scores are as in table 1.

Table 1. Problem Solving Test Scoring Guidelines

Score	Problem Solving Criteria				
	Problem focus	**Physical description**	**Planning completion**	**Implementing the plan**	**Evaluating the completion**
0	Do not know	There is no	No plan	No progress	There is no
1	Less interpreting questions	Knowing a few variables	Mathematical equations are not related	Mismatch finish	Encountered a mathematical error
2	Understand the problem	Incomplete description	Mathematically correct equations	Complete but not complete	Experienced at a dead end and stopped
3		Make complete		Complete a complete plan	Completing but manipulating numbers wrong
4				Complete continue completion	Complete and complete
Score Max.	**2**	**3**	**2**	**4**	**4**

The method of calculating the final value is as follows [**8**],

$$P = \frac{x}{x_i} \times 100\% \quad (1)$$

explanation :
P = percentage
x = the value given by the respondent on one indicator
x_i = the maximum value on one indicator

The score of problem solving skills obtained by students from the calculation is then classified according to each indicator according to the problem solving stages. Heller, et, al. The guidelines for categorizing the test scores for problem solving skills are as in table 2 below.

Table 2. Guidelines for Categorizing Problem Solving Skills Scores[**9**]

Percentage (%)	Category
0 - 39,99	Very less
40 – 54,99	Less
55,00 – 69,99	Enough
70,00 – 84,99	Good
85,00 - 100	Very good

3. Result and Discussion

This research was conducted through online teaching by applying blendid learning: virtual face-to-face and non-virtual face-to-face.The results of the study were obtained through a problem-solving test in class VIII students of one MTs in Gorontalo totaling 20 students. The test that was tested was in the form of a description test with the topic of light as many as five items adjusted to the answer guidelines based on problem solving indicators developed by Heller, et. al, namely the focus of the problem, a physical description, planning solutions, implementing plans and evaluating solutions. Based on the results of the data analysis obtained, the students' answers were categorized into 3 groups, namely high (S1), low (S2) and less (S3) problem solving skills.The results of the analysis of the answers to the 3 subjects are as in Figure 1 below.

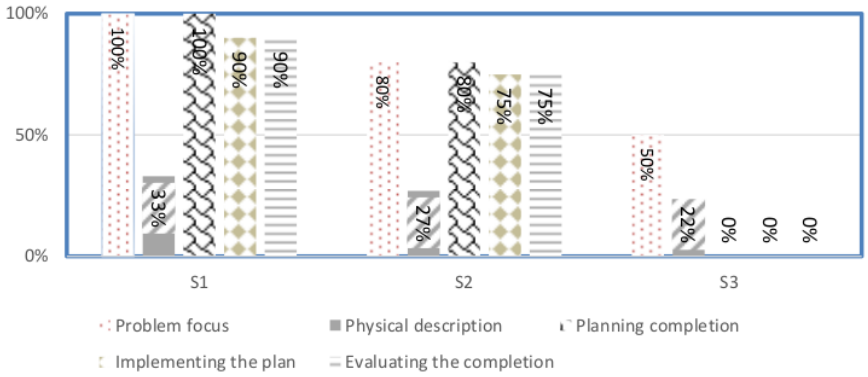

Figure 1. Diagram of Problem Solving Test Results

It can be seen in Figure 1, the percentage of problem solving test results based on the indicator stages developed by Heller, et. al, the three subjects have different skills in solving problems. The following is the test score data for problem solving skills and the results of interviews with the three subjects.

3.1. S1 Subject (High Problem Solving Skills)

Based on the diagram in Figure 1, the S1 subject managed to achieve a percentage of 100% for the problem focus indicator and the indicator planning solution. This means that from all the questions given, the S1 subject can understand the problem properly and accurately and can describe the mathematical problem correctly.The indicators of implementing the plan and evaluating the completion of the S1 subject reach a percentage of 95%, which means being able to complete the plan and evaluate the completion of the answers well. As for the physical depiction indicators, the S1 subject is still very low where the percentage obtained only reaches 33%, which means that of the 5 questions given only 2 questions can be described in full physics.

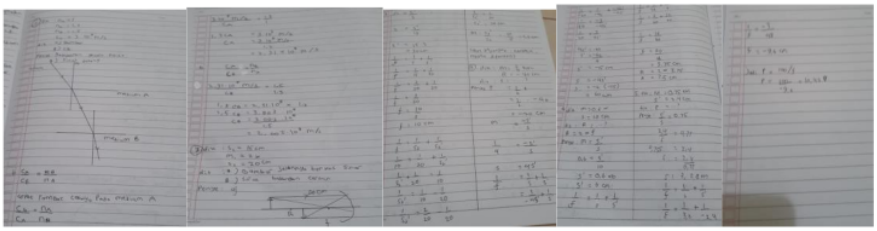

Figure 2. Result of Problem Solving for S1 (T) Subjects

In addition to the written test, an online interview was conducted, in which the subject stated that problem solving indicators, especially in the physical picture, were not depicted or described, because it was still difficult to translate the questions into the form of physical images. But the subject understands the stages in problem solving.With today's online learning, subjects find it more difficult to receive material compared to face to face, especially when learning takes place, the network often experiences interference.

3.2. S2 Subject (Medium Problem Solving Skills)

S2 subjects are students who have moderate problem solving skills. Where based on the diagram in Figure 1, the percentage of problem-solving test results for S2 subjects reaches 80% on the problem focus indicator and the indicator planning solution. This means that from all the questions given there is 1 question that is less able to be interpreted properly.However, the rest of the S2 subjects are able to understand the problem well and describe the mathematical problems correctly. For indicators of implementing the plan and evaluating the completion, the percentage obtained is 75%, which means that the S2 subject in the problem solving process is able to complete the completion plan but is not complete. As for the physical depiction indicators, the S2 subject is still very low where the percentage obtained only reaches 27%.

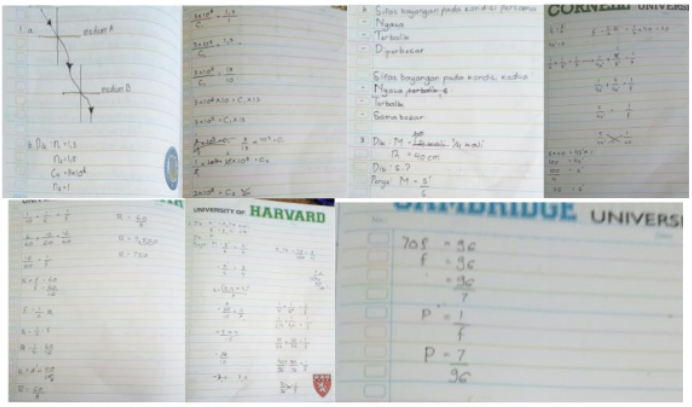

Figure 3. Results of S2 (S) Problem Solving

Apart from the written test, an online interview was also conducted. Where, the subject stated that in working on the problem, the subject often experienced problems, especially at the completion stage. The subject knows the mathematical equation to be used in the problem. But it is difficult to move on to the next stage and usually completes complete but misoperating numbers.In addition, with online learning during the Covid-19 pandemic, the subject experienced problems in learning. S2 subjects find it easier to understand explanations when face to face in class, not virtually or online.

3.3. S3 Subject (Low Problem Solving Skills)

S3 subjects are students whose problem solving skills fall into the low category. Where based on the results of written tests that have been carried out, the subject has not been able to understand the questions well. This can be seen in Figure 1, the percentage obtained is only 50% for the problem focus indicator. For the S3 subject itself, it can determine the focus of the problem, it's just that it lacks in interpreting the questions well. As for the next indicator stage, the subject did not describe it.

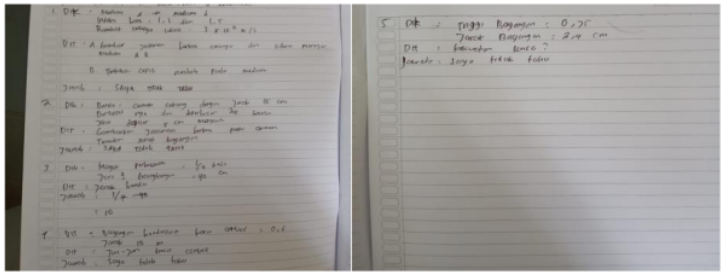

Figure 4. The Results of S3 (R) Subject Problem Solving

Apart from the written test, an online interview was also conducted. Where, the subject stated that they still lacked mastery of the material and were difficult to solve problems using the problem-solving stage. Especially with online learning making the subject slower in the process of absorbing material, especially when in face-to-face virtual online learning, subjects often lag behind due to network problems. Based on the overall problem solving test answers, the average results of problem-solving skills are obtained as in table 3 below.

Table 3. Results of the Average Analysis of Students' Problem Solving Skills

No	Indicator	Percentage	Category
1	Problem Focus	72.50%	Good
2	Physical description	14.66%	Very less
3	Planning completion	64.50%	Good
4	Implementing the plan	54.75%	Less
5	Evaluating the completion	56.50%	Enough
	Average	52.58%	Less

Table 3, shows the average problem-solving skills of students in general, amounting to 20 people, in the low category, with a percentage of 52.58%. Based on each indicator of problem solving skills, as many as 72.50% were included in the good category for the problem focus indicator; 14.66% for physical description indicators; 64.50% for indicators planning completion; 54.75% for indicators of implementing the plan; and for indicators evaluating the completion reached 56.50%.The low level of problem-solving skills related to learning the application of blended learning is experiencing problems in student conditions such as internet access networks, internet access quotas and other facilities such as smartphones. It is also related to independent learning when studying and online teaching. Independence in online teaching can teach knowledge, skills and procedures as well as a broader range

of difficult tasks or problems[10]. Students need independence in online learning. Student independence needs to be improved because prior to the Covid-19 pandemic learning was carried out in full face-to-face in the classroom. Some respondents stated that they are more focused through face-to-face learning in direct class than virtual face-to-face teaching or online discussions.

4. Conclusions

Based on the results and discussion that has been previously stated, it can be concluded that, students with high problem solving skills are able to complete the solving test well based on the problem solving indicator stages, but the subject has not been able to describe completely for the physical description indicators.For students with moderate problem solving categories, have not been able to complete the problem solving test appropriately based on the problem solving indicator stage. Especially at the completion stage, it is still difficult to complete the problem-solving test completely. For students with a low problem solving category, did not complete the problem solving test based on the problem solving indicator stage.

Overall, the average score of students' problem solving skills in the research subject was low. The low problem solving skills of students for the concept of physics on the topic of light needs to be improved in the application of blended learning, especially related to the obstacles faced by students in implementing blended learning during the Covid-19 pandemic, including internet network access, internet quota, smartphone facilities and student independence. in solving tasks and concepts of physics problems.

Acknowledgments

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References

[1] Manggabarani, A. F., Sugiarti, & Masri, M 2016 Pengaruh Model Pembelajaran Blended Learning Terhadap Motivasi dan Hasil Belajar Siswa Kelas X SMA Negeri 1 Pitumpanua Kab . Wajo (Studi Pada Materi Pokok Sistem Periodik Unsur) *Jurnal Chemica* 17(2), 83–93.

[2] Dziubal, Charles., et.al 2018 Blended learning: the new normal and emerging technologies. *International Journal of Educational Technology in Higher Education* volume 15, Article number: 3. (https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-017-0087-5. Diakses pada tanggal 19 Agustus 2020)

[3] Anggraini, A. D., Wonorahardjo, S., & Utomo, Y 2016 Efektivitas Pembelajaran Blended Learning Berbasis Community on Inquiry (CoI) ditinjau dari Belajar Kognitif Mahasiswa pada Materi Kromatografi *Prosiding Seminar Nasional II* 1038–1046.

[4] Yapici, I. U., & Akbayin, H 2012 The Effect of Blended Learning Model in High School Students' Biology Achievement and on Their Attitudes Towards the Internet *The Turkish Online Journal of Educational Technology* 11, 228–237.

[5] Gunantara, G., Suarjana, I. M., & Riastini, P. N 2014 Penerapan model pembelajaran problem based learning untuk meningkatkan kemampuan pemecahan masalah matematika siswa kelas V *Jurnal Mimbar PGSD Universitas Pendidikan Ganesha Jurusan PGSD*, 2(1). Retrieved from (https://ejournal.undiksha.ac.id/index.php/JJPGSD/article/view/2058. Diakses pada tanggal 19 Agustus 2020)

[6] Odja, A. H, Jatmiko, B., & Supardi, Z.A. I 2014 *Model Konseptual Observasi Ilmiah Berorientasi Kemandirian Dalam Pembelajaran Sains Untuk Melatihkan Keterampilan Pemecahan Masalah. Surabaya*.

[7] Heller, P., & Heller, K. 1999 *Cooperative group problem in physics* University of Minnesota.

[8] Aji, S. D., Hudha, M. N., & Rismawati, A. Y 2017 Pengembangan modul pembelajaran fisika berbasis problem based learning untuk meningkatkan kemampuan pemecahan masalah fisika. *Jurnal Pendidikan* , 43-48.

[9] Alieffia, Z & Tantri, M 2018 Profil Kemampuan Memecahkan Masalah Pelajaran Fisika Siswa MTs *Prosiding Seminar Nasional Quantum* Yogyakarta
[10] Caladine, Richard 2008 *Enhancing E-learning with Media-Rich Content and Interactions Hershey: Information Science Publishing*

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