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Analysis of Physics Practicum Problems Faced by Students during Distance Learning

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Abstract *– Practicum is an important part of science education. The purpose of this research is to examine the practical challenges encountered by students at MTs DDI Sepange during distant learning, as well as the various solutions proposed. This is a qualitative descriptive study with a sample size of 24 students. Data were gathered through observation and open interviews with sciences subject teachers and a number of students. Furthermore, researchers employed a questionnaire approach to assess the viability of problem-solving solutions. The findings revealed that the problems encountered by students during the pandemic were related to the implementation of practicum, specifically that the process of implementing the practicum was not properly carried out, the availability of tools and materials to carry out the practicum was very limited, and it was difficult to carry out the practicum without direct guidance and instructions from the teacher. Based on these problems, the solution suggested to solve practical obstacles during distance learning is practicum guidelines involving the use of simple materials and tools found in the students' surroundings.*

Keywords: *distance learning; practicum; science lessons*

I. INTRODUCTION

At the junior high school level, physics-related material is included in science subjects. In these subjects, especially those related to physics, there are several practicums or experiments that are very important to do in order to increase students' understanding of the subject matter that has been delivered. Practical physics in science subjects is generally carried out in a school environment and face-to-face between teachers and students (Bancong & Putra, 2015). However, since the coronavirus (Covid-19) infects almost all countries in the world so that it is designated as a pandemic, the order in all fields has undergone drastic changes, including in the field of education (Alea et al., 2020; Sholikah et al., 2020).

Changes that occurred in the field of education with the pandemic, namely that almost all educational activities that were previously carried out face-to-face or offline had to be replaced by online learning (Alea et al., 2020). These sudden and drastic changes

make students and teachers overwhelmed in adapting. Moreover, for teachers who are effective in calculation subjects and subjects in which there are several practicums, one of which is science subjects. One of the main discussions in science subjects is physics material (Napsawati & Yusdarina, 2021; Saputra et al., 2021). This change is also quite felt in MTs DDI Seppange as one of the schools located far from the urban center.

As is the case with students in general, students at MTs DDI Seppange often assume that the Natural Science subject is one of the most difficult subjects. Most of them think that science physics is a subject that is less interesting and difficult to understand. One of the efforts to overcome these difficulties is conducting experiments related to the existing material so that these students understand it better (Napsawati, 2019; Nurazmi et al., 2021). However, if it is related to the description above, the learning process has undergone drastic changes since the pandemic resulted in the learning process having to be carried out online or remotely, including remote practicum.

The existence of several experiments or practicums that must be carried out remotely in Physics Science subjects often makes teachers at MTs DDI Seppange confused about how to keep students able to carry them out. The limited number of experimental tools and materials is one of the factors that make it difficult to conduct a physics science practicum remotely. Thus, it is necessary to solve problems related to the implementation of remote practicum in Physics Science subjects so that students can still understand and carry out the practicum even though the implementation process is not directly at school. So that there is a need for problem-solving so that both teachers and students are able to get something according to their wishes (Sumartini, 2016).

Problems can occur in any scope, anywhere and anytime, and by anyone including in the world of education, so it is very necessary to solve problems with these problems. Problem-solving refers to a person's cognitive organizing process (Sulasmono, 2012). Problem-solving is a process that is carried out by someone in combining previous knowledge to complete a task for which the completion procedure is not known (Saputri, 2019). Meanwhile, according to (Cahyani & Setyawati, 2017), problem-solving is one of the goals in the learning process in terms of the curriculum aspect. Departing from this understanding, it is very important to do remote practicum problem-solving in Physics Science subjects considering the difficulty of implementing practical work without direct assistance by the teachers.

Practicum is one of the activities that play a very important role in increasing the success of the teaching and learning process (Baeti et al., 2014). The results of valuable practicums or experiments can be used for human prosperity

(Kurniawati et al., 2015; Rini & Nurazmi, 2020). Distance practicum is an alternative so that subjects that have practical material can be carried out during the pandemic and during the distance learning period is still ongoing. The continuity of remote practicum still feels foreign to most students and teaching staff at school because so far, the practicum has been carried out directly.

Based on the description above, the purpose of this study is to examine the practical challenges encountered by students at MTs DDI Sepange during distant learning, as well as the various solutions proposed.

II. METHODS

This study is a descriptive qualitative research conducted at MTs DDI Sepange, with a total sample of 24 students consisting of representatives of classes VII, VIII, and IX. The method of data collection was carried out by observation and open interviews with Physics Science subject teachers and several students of MTs DDI Sepange. The interview guidelines used in this study are related to the problems experienced by students related to the implementation of the Physics Science practicum.

The research steps include practicum planning, practicum implementation, and practicum result evaluation. While the method of data collection is done by observation, interviews, and questionnaires. The level of validity of observations, interviews, and questionnaires are as follows:

Tabel 1. Reliability Statistic observation

Cronbach's Alpha	N of Item
.880	9

Tabel 2. Reliability Statistic interview

Cronbach's Alpha	N of Item
.891	3

Tabel 3. Realibility Statistic questionnaires

Cronbach's Alpha	N of Item
.880	11

To measure the feasibility level of the solution applied in the form of a remote practicum guide using the Gregory test with two experts using the equation:

$$r = \frac{D}{A+B+C+D} \qquad (1)$$

information

r : Content validity

A : Both Experts disagree

B : Expert 1 agrees, Expert 2 disagrees

C : Expert 1 disagrees, Expert 2 agrees

D : Both experts disagree

Meanwhile, to measure the feasibility level of using practicum guidelines based on respondents' responses, using a questionnaire consisting of 3 indicators, namely the ease of understanding the guidelines, the ease of carrying out the practicum and the suitability of the practicum with the material.

Furthermore, to measure the feasibility of the problem-solving solution applied by

the researcher using a questionnaire technique and for data analysis techniques, it is done by means of percentage descriptive data analysis.

$$P = \frac{F}{N} x100\% \qquad (2)$$

Information

P = Percentage

F = Frequency / number of respondents' answers

N = Number of respondents

III. RESULTS AND DISCUSSION

A. Results

Based on the results of research that has been carried out through interview techniques related to the problem of implementing Physics Science practicum, information is obtained from 24 students who have been interviewed, their answers to the process of implementing remote practicum are generally the same, namely as follows:

Tabel 4. Interview result

Questions	Answer/ response
During distance learning, have you ever carried out a practicum?	During the pandemic, the process of implementing the Physics Science practicum was not carried out
What are the obstacles so that the implementation of the practicum does not go well?	The implementation of the Physics Science practicum during the pandemic was not carried out due to the limited availability of tools and materials to be used during the practicum, besides that another reason was the difficulty of monitoring the long-distance practicum implementation process that would be carried out by students so that students were not allowed to borrow available lab equipment because It is feared that these students cannot operate it without direct supervision by the teacher
Do you feel that remote practicum is important?	Practicum is very important to deepen understanding of the subject matter

Based on the results of the interview above, it is necessary to solve the problems encountered during the practicum during the pandemic. The solution applied is the use of simple tools and materials that are easily obtained so that students can carry out practicals with the help of Distance Practicum guidelines. Figure 1 below shows an example of a practical implementation guide that will be applied.

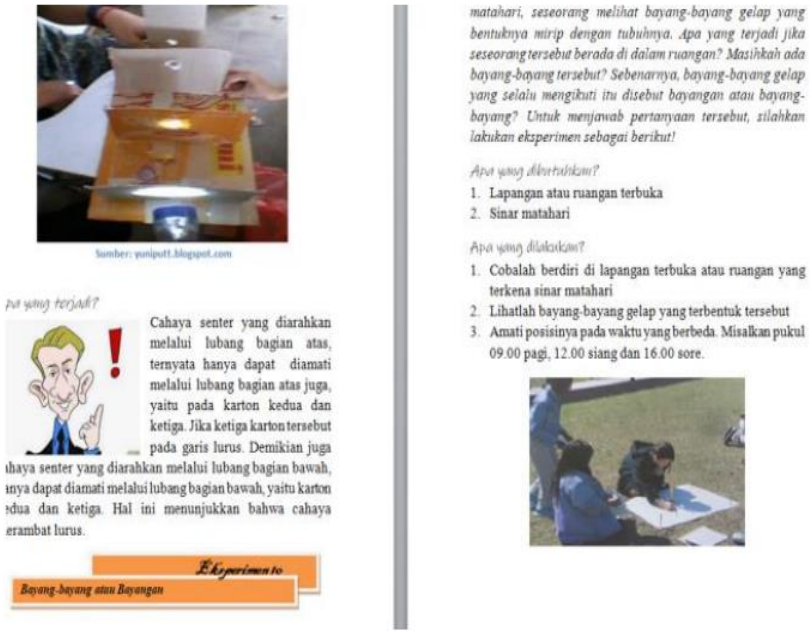

Figure 1. Example of the contents of remote practicum guidelines

Furthermore, to measure the level of validity of the practicum guidelines that have been prepared, the Gregory test is used. From the test using the Gregory test, it was obtained that the validity test was obtained:

$$r = \frac{3}{0+1+0+3} = 0{,}75$$

So the value of r indicates that the guideline is feasible to use. Furthermore, to see the level of feasibility of the solutions offered based on student responses, see the table below:

Table 5. The feasibility level of Distance Practicum implementation through practicum guidelines based on student responses

Indicator	Eligibility Level
Ease of understanding practical guidelines	83,33%
Ease of practical implementation	83,33%
The compatibility of the practicum with the material	87,5%
Average	84,72%

Based on the results in table 1, it shows that students feel very helped by the existence of these guidelines. This can be seen from the high level of student responses regarding the level of feasibility of the guidelines in terms of the ease of understanding the contents of the guidelines, the ease of carrying out the practicum and the suitability of the practicum with the material that has been presented with an average feasibility level of 84.72%

B. Discussion

Based on the background of the problem that the purpose of this study is to overcome the problems that are often faced by both students and teachers. The problem is related to the implementation of practicum during the pandemic. Based on the research

that has been done (Sholikah et al., 2020) shows that practicum is very important, considering that practicum can support students' understanding of abstract material in the field of science that needs to be concreted. The implementation of the practicum during the pandemic is carried out remotely, either through virtual laboratories or practicum videos (Frima, 2020). However, for schools that have inadequate levels of network availability and internet facilities, this method is considered inappropriate.

Based on the results of the study, it was shown that during the pandemic, the practicum was not carried out due to the lack of understanding of the students in carrying out the practicum without direct direction from their teacher. In addition, another factor that hinders the implementation of the remote practicum is the unavailability of guidelines or practical instructions that are easy to apply by students even without direct supervision from the teacher. The gap in the implementation of the remote practicum is not only felt within the scope of schools but also in universities (Saraswati & Mertayasa, 2020).

The absence of a practicum process in learning in the laboratory requires alternative solutions so that the skills transfer process can still take place (Nugroho, 2021). Therefore, departing from this problem, the problem-solving solution applied is the existence of a remote practicum guide that includes simple experiments both through the use of tools and objects around or through hands-on or observations of natural events. Research on hands-on in increasing the creative ability of students' scientific literacy has been carried out by (Ulum et al., 2019). The results of the research that have been obtained indicate that the hands-on method is less effective in increasing creativity in understanding colloidal material.

Research on the hands-on method has also been carried out by (Mustika et al., 2016). In their research, it was demonstrated that by using the hands-on method, the learning outcomes of students by applying contextual learning through hands-on problem solving on cube and block material in class VIII of SMP Negeri 10 Banda Aceh reached a good category, and students' activities during learning were active. Some of the previous studies above regarding the hands-on method in learning were then re-applied in this study but in a different form. To make it easier for students to understand the guidelines, each experiment is equipped with pictures according to the experimental steps so that students can still understand the steps even though they are not under direct teacher supervision. In addition, each practicum activity consists of practicum objectives, basics, and deepening of material containing tasks to deepen the knowledge that has been learned from the practicum.

Furthermore, good practicum guidelines need evaluation from several aspects. These aspects are aspects of content

feasibility, linguistic feasibility, and presentation feasibility. However, at this stage, the only aspect that is assessed is the content aspect of the guideline. The content aspects of the practicum guidelines assessed relate to the introductory page, introductory material, core material, and questions presented. The core material of this practical guide is temperature and heat, and material about electricity.

To overcome the problem of remote practicum, in addition to the hands-on method, another method is applied, namely through the use of simple tools and materials that can be used. The use of simple tools and materials is intended so that students can do practical work safely even without direct supervision from the subject teacher. The use of simple tools and materials in practicum has also been previously carried out by (Prasetyo et al., 2019). The results obtained indicate that the learning media developed is feasible to be applied because it can increase students' learning motivation.

In addition to the research that has been carried out by (Prasetyo et al., 2019), the research related to the use of simple tools and materials has also been carried out previously by (Widayanti & Yuberti, 2018). The research was conducted to enable respondents to do practical work by utilizing simple tools and materials. The results of the previous research are not much different from the results of this study, namely that the guidelines that have been applied are feasible to use. Based on the results of data processing related to the feasibility of remote practicum guidelines, it shows that these guidelines are feasible to be applied based on the Gregory test, and this is also reinforced by the average value of the feasibility level of 84.72%.

Thus, the practicum guidelines applied are feasible and can facilitate students in carrying out practicals. So that students can still be implemented even remotely. With appropriate solutions applied, students can continue to carry out practicums to develop their creativity. This is one of the goals of the practicum, as expressed by (Hendriyani & Novi, 2020), that the independent practicum activities are designed to develop creativity and oral communication skills.

IV. CONCLUSION AND SUGGESTION

The conclusions in this study were the problems faced by students during the pandemic were related to the implementation of practicum, specifically that the process of implementing the practicum was not properly carried out, the availability of tools and materials to carry out the practicum was very limited, and it was difficult to carry out the practicum without direct guidance and instructions from the teacher. Based on these problems, the solution suggested to solve practical obstacles during distance learning is practicum guidelines involving the use of simple materials and tools found in the students' surroundings.

The research results obtained will be useful, especially for science teachers as one of the considerations in carrying out science practicums during distance learning. Furthermore, researchers who are interested in conducting research related to distance practicum should take a larger number of student samples and locations so that the results obtained are more varied.

REFERENCES

Alea, L. A., Fabrea, M. F., Roldan, R. D. A., & Farooqi, A. Z. (2020). Teachers' Covid-19 awareness, distance learning education experiences and perceptions towards institutional readiness and challenges. *International Journal of Learning, Teaching and Educational Research*, *19*(6), 127–144. *https://doi.org/10.26803/ijlter.19.6.8*

Bancong, H., & Putra, D. P. (2015). Analisis proses keterampilan proses sains mahasiswa berdasarkan gaya berpikir dan kecerdasan jamak pada praktikum fisika modern di Universitas Muhammadiyah Makassar. *Jurnal Pendidikan Fisika*, *3*(1), 27–33. Doi: https://doi.org/10.26618/jpf.v3i1.248

Baeti, S. N., Binadjha, A., & Susilaningsih, E. (2015). Pembelajaran berbasis praktikum bervisi sets untuk meningkatkan keterampilan laboratorium dan penguasaan kompetensi. *Jurnal Inovasi Pendidikan Kimia*, *8*(1), 1260–1270.

Cahyani, H., & Setyawati, R. W. (2016). Pentingnya peningkatan kemampuan pemecahan masalah melalui PBL untuk mempersiapkan generasi unggul menghadapi MEA. *PRISMA, Prosiding Seminar Nasional Matematika*, 1(1), 151–160.

Frima, F. K. (2020). Penerapan praktikum jarak jauh pada topik pertumbuhan mikroba dalam masa darurat covid-19 di institut teknologi sumatera. *Jurnal Pendidikan Sains*, *8*(2), 102. https://doi.org/10.26714/jps.8.2.2020.102-109

Hendriyani, M. E., & Novi, R. (2020). Pengembangan video presentasi untuk melatih kreativitas dan komunikasi di masa pandemi covid-19. *Prosiding Seminar Nasional Pendidikan FKIP*, *3*(1), 328–339.

Kurniawati, L., Akbar, R. O., & Misri, M. A. (2015). Pengaruh penerapan metode pembelajaran praktikum terhadap keterampilan berpikir kritis matematika siswa kelas VIII SMPN 3 sumber Kabupaten Cirebon. *EduMa : Mathematics Education Learning and Teaching*, *4*(2), 62–74. https://doi.org/10.24235/eduma.v4i2.30

Mustika, A., Suhartati., & Syahyuzar. (2016). Penerapan pembelajaran kontekstual melalui hands on problem solving pada materi kubus dan balok kelas VIII SMP Negeri 10 Banda Aceh. *Jurnal Ilmiah Mahasiswa Pendidikan Matematika*, *1*(1), 49–58.

Napsawati. (2019). Hubungan kinerja dan kepribadian guru dengan motivasi belajar fisika peserta didik SMA Negeri se-Kabupaten Bantaeng. *Karst: Jurnal Pendidikan Fisika dan Terapannya*., *2*(2), 64-70.

Napsawati, N., & Yusdarina, Y. (2021). Application of ludo board game in increasing the activeness of the physics study group of Mts DDI Seppange students. *Jurnal Pendidikan Fisika*, *9*(1), 98–106. https://doi.org/10.26618/jpf.v9i1.4074

Nugroho, A. (2021). Efektifitas laboratorium virtual dalam pembelajaran praktikum analisis farmasi pada mahasiswa farmasi saat pandemic covid-19. *Refleksi Pembelajaran Inovatif*, *3*(1), 317–324. https://doi.org/10.20885/rpi.vol3.iss1.art1

Nurazmi., Linawati., & Khaeruddin. (2021). Guided inquiry learning model: How does it influence students'achievement?. *Jurnal Pendidikan Fisika*, *10*(1), 55-59. https://doi.org/10.22611/jpf.v10i1.25595

Prasetyo, D. R., Fawaida, U., & Noor, F. M. (2019). Pemanfaatan alat dan bahan dari lingkungan sebagai media pembelajaran sederhana mata pelajaran IPA untuk meningkatkan motivasi belajar siswa Mts Muwahidun Gembong. *Thabiea : Journal of Natural Science Teaching*, *2*(2),111–117. https://doi.org/10.21043/thabiea.v2i2.5967

Rini & Nurazmi. (2020). An analysis of retention viewed from physics outcomes of students in class XI MIPA SMA Negeri 1 Takalar. *Jurnal Pendidikan Fisika*, *8*(2), 201-210. https://doi.org/10.26618/jpf.v8i2.3384

Saputra, I. G. P. E., Sejati, A. E., & Nurazmi, N. (2021). Development of virtual laboratory system using ewb and zoom cloud in dynamic electricity practicum as a learning solution in the covid-19 pandemic. *Jurnal Pendidikan Fisika*, *9*(3), 262-272. https://doi.org/10.26618/jpf.v9i3.6066

Saputri, N. A. (2019). Analisis faktor-faktor yang memepengaruhi minat mahasiswa berwirausaha. *Jurnal Inovasi Ekonomi*, *4*(01), 13–18. https://doi.org/10.22219/jiko.v4i01.8177

Saraswati, N. L. P. A., & Mertayasa, I. N. E. (2020). Pembelajaran praktikum kimia pada masa pandemi covid-19: qualitative content analysis kecenderungan pemanfaatan teknologi daring. *Wahana Matematika Dan Sains: Jurnal Matematika, Sains, Dan Pembelajarannya*, *14*(2), 144–151. http://dx.doi.org/10.23887/wms.v14i2.28297

Sholikah, T., Mardhotillah, A. F., Indriyani, L. A., Wulandari, V. A., Kuraesin, P. S., Al-Khotim, N. L. S. A., Irjiananto, M. Y., Fatmah., Ma'arif, M., Fadhillah, N., & Rachmawati, Y. (2020). Studi eksplorasi kegiatan praktikum sains saat pandemi covid-19. *Indonesian Journal of Science Learning*, *1*(2), 67–75.

Sulasmono, B. S. (2012). Problem solving: signifikansi, pengertian, dan ragamnya. *Satya Widya: Jurnal Penelitian Pengembangan Kependidikan*, *28*(2), 155. https://doi.org/10.24246/j.sw.2012.v28.i2.p155-166

Sumartini, T. S. (2016). Peningkatan kemampuan pemecahan masalah matematis siswa melalui pembelajaran berbasis masalah. *Mosharafa: Jurnal Pendidikan Matematika 5*(2), 148–158.

Ulum, M., Firmansyah, R. A., & Fibonacci, A. (2019). Effectiveness of hands on minds on activities based on socioscientific issue on scient literation. *Paedagogia*, *22*(2), 159–170. https://doi.org/10.20961/paedagogia.v22i2.

Widayanti, W., & Yuberti, Y. (2018). Pengembangan alat praktikum sederhana sebagai media praktikum mahasiswa. *JIPFRI: Jurnal Inovasi Pendidikan Fisika Dan Riset Ilmiah*, *2*(1), 21–27. https://doi.org/10.30599/jipfri.v2i1.161