Binar Kurnia Prahani <binarprahani@unesa.ac.id>

Konfirmasi New Submission

2 messages

JPPPF <jpppf@unj.ac.id> Sat, Jul 30, 2022 at 5:33 PM
To: Binar Kurnia Prahani <binarprahani@unesa.ac.id>

Yth. Pemakalah,

“Research Profile of Discovery Learning in Physics Learning During the COVID-19 Pandemic”

Melihat data status submission pada sistem OJS JPPPF, perlu Kami sampaikan beberapa hal sebagai berikut:

1. Semua submission di JPPPF harus mengikuti gaya selingkung terutama format naskah, silakan mengacu ke http://journal.unj.ac.id/unj/index.php/jpppf/manuscripttemplate
2. Mulai Tahun 2018 Nomor 2, JPPPF sudah full bahasa inggris, silakan lampirkan dua versi bahasa fullpaper saat membuat submissions baru, atau kirimkan semua perbaikan melalui reply email ini. Abaikan poin ini jika submission sudah dalam Bahasa Inggris.
3. Semua submissions baru Mulai 1 Juli 2019 akan dikenakan biaya publikasi (APCs) sebesar IDR 1.500.000,00 yang dibayarkan **jika status accepted.** Silahkan konfirmasi kesediaan membayar APCs ini dengan reply email ini.

Demikian informasi yang dapat kami sampaikan, mohon untuk dapat mengonfirmasi 3 hal tersebut di atas dengan reply pesan ini.

Binar Kurnia Prahani <binarprahani@unesa.ac.id> Sat, Jul 30, 2022 at 7:14 PM
To: JPPPF <jpppf@unj.ac.id>

Dear Editor

Kami menyetujui informasi tersebut. Kami berharap paper kami dapat terbit di JPPPF.

Salam Hormat

Dr. Binar Kurnia Prahani
Universitas Negeri Surabaya
[Quoted text hidden]

Binar Kurnia Prahani <binarprahani@unesa.ac.id>

Review Results and Revisions Required

1 message

JPPPF <jpppf@unj.ac.id> Sun, Oct 30, 2022 at 2:03 PM
To: Binar Kurnia Prahani <binarprahani@unesa.ac.id>

Dr. Binar Kurnia Prahani:

We have reached a decision regarding your submission to Jurnal Penelitian & Pengembangan Pendidikan Fisika, "Research Profile of Discovery Learning in Physics Learning During the COVID-19 Pandemic ".

1. Our decision is: Revisions Required
2. Please Revise your paper and fill the author responses form, for the First Reviewer also attach review file.
3. Attach your revision and **author responses** in the OJS system in the revision section

Editor JPPPF
jpppf@unj.ac.id

Reviewer A:
Recommendation: Revisions Required

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1. The title represent the paper content.

Good

2. Comments for title.

Good

3. The abstract represent the content of the paper (the purpose, methods, results, and impacts).

Good

4. The keywords indicate the scope of the research.

Good

5. Comments for the abstract and the keywords.

data analysis technique?

6. The introduction was supported by theory and previous research.

Good

7. Comments for introduction.

Is it true that harefa recommends the discovery model, check it out
Harefa, D & Telukdalam, P 2021, 'Penggunaan Model Pembelajaran Student Facilitator and Explaining Terhadap Hasil Belajar Fisika', Jurnal Dinamika Pendidikan, vol. 14, no. 1, pp. 116–131.

8. The selected research methodology was appropriate for solving the problem.

Good

9. Comments for methodology.

How is the relationship between data collection and conclusion?

10. The data presentation and its interpretation are original and reasonable.

Good

11. The data presentation and its interpretation were answer problems or hypotheses.

Average

12. The discussion analyzing the results.

Average

13. Comments for results and discussion.

determine the indicators/profile grids and discuss according to the findings in the journal on the application of learning during the covid period, with the result data obtained in the journal

14. The summary was answer the problem clearly.

Average

15. Comments for summary.

research and future implications

16. The relevance of the topic to be published in JPPPF.

Good

19. All references support the contents of the article.

Good

20. Comments for reference.

Good

22. Additional comments to author.

See Comment

Reviewer B:

Recommendation: Revisions Required

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1. The title represent the paper content.

Good

2. Comments for title.

The title has been compiled briefly, clearly, in accordance with the contents of the article and relevant to the scope of JPPPF

3. The abstract represent the content of the paper (the purpose, methods, results, and impacts).

Good

4. The keywords indicate the scope of the research.

Good

5. Comments for the abstract and the keywords.

The abstract component is fulfilled. and the keyword is correct

6. The introduction was supported by theory and previous research.

Good

7. Comments for introduction.

Introduction is supported by the latest and relevant articles
There is something new that will be presented in this article

8. The selected research methodology was appropriate for solving the problem.

Good

9. Comments for methodology.

The methodology has been presented in full

10. The data presentation and its interpretation are original and reasonable.

Poor

11. The data presentation and its interpretation were answer problems or hypotheses.

Poor

12. The discussion analyzing the results.

Poor

13. Comments for results and discussion.

The data is not presented properly
Table 1 was not found in the article

In the abstract, it is explained that the data presented are only the results of studies from 10 articles. The number of articles analyzed is very less because it is at least 30 articles.

14. The summary was answer the problem clearly.

Poor

15. Comments for summary.

Not relevant to the data and discussion

16. The relevance of the topic to be published in JPPPF.

Good

19. All references support the contents of the article.

Poor

20. Comments for reference.

References to data sources are still lacking. Literature review is carried out from at least 30 relevant references. References are written using the existing system in word

22. Additional comments to author.

Revise according to the suggestions given

Reviewer C:
Recommendation: Revisions Required

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1. The title represent the paper content.

Good

2. Comments for title.

it clear

3. The abstract represent the content of the paper (the purpose, methods, results, and impacts).

Good

4. The keywords indicate the scope of the research.

Average

5. Comments for the abstract and the keywords.

It repeat during the COVID-19 6 times. It will be better to reduce it

6. The introduction was supported by theory and previous research.

Average

7. Comments for introduction.

it clear

8. The selected research methodology was appropriate for solving the problem.

Poor

9. Comments for methodology.

it clear

10. The data presentation and its interpretation are original and reasonable.

Good

11. The data presentation and its interpretation were answer problems or hypotheses.

Average

12. The discussion analyzing the results.

Average

13. Comments for results and discussion.

the discussion is quite not that comprehensive
I think it will be better to put which article is become the main source

14. The summary was answer the problem clearly.

Good

15. Comments for summary.

Conclusion is not clearly stated. It need to answer the aims for this research

16. The relevance of the topic to be published in JPPPF.

Average

19. All references support the contents of the article.

Average

20. Comments for reference.

Follow the Harvard Style Referencing

22. Additional comments to author.

Revision

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2 attachments

Binar-reviewer1-comments.doc
351K

JPPPF-AuthorResponse_nv2022.docx
17K

Research Profile of Discovery Learning in Physics Learning During the COVID-19 Pandemic

Binar Kurnia Prahani [1,*)], Budi Jatmiko[1)], Tan Amelia[2)], Shalsa Billa Ardhana Neswary [1)], Kirana Aureola Arzak[1)], Nova Allysa Qotrunnada[1)]

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Abstract

This research aims to analyze the application of discovery learning to physics learning during the COVID-19 pandemic. This research method is a study of literature and journals as many as ten journals that can be accounted for related to the application of discovery learning research models to physics learning during the COVID-19 pandemic in Indonesia. The study was analyzed using qualitative descriptive analysis. It was concluded that: 1) The application of the discovery learning model to physics learning during the COVID-19 pandemic can improve student understanding, students' critical thinking ability, and mastery of student concepts. 2) The use of online learning tools and discovery learning-based e-modules can improve students' mastery of concepts in physics learning during the COVID-19 pandemic. 3) The advantages of the discovery learning model in physics learning during the COVID-19 pandemic are that it can improve cognitive abilities and can form disciplined and positive attitudes of students. 4) The flexibility of the discovery learning model in physics learning during the COVID-19 pandemic is that students have difficulty understanding the material and teachers find it difficult to present the material so that the application of the discovery learning model in physics learning during the COVID-19 pandemic in Indonesia is not all effective.

Commented [RE1]: data analysis technique?

Keywords: COVID-19 Pandemic, Discovery Learning, Physics Learning

INTRODUCTION

The COVID-19 pandemic is becoming global at this time (Ibrahim et al. 2020). The COVID-19 pandemic caused many unexpected global challenges for different countries (Ametepe & Khan 2021) one of them is Indonesia (Fajri et al. 2021). Information about COVID-19 from various news stories grabbed the attention of the world community (Hakim & Mulyapradana 2020). The COVID-19 pandemic has not only had a devastating impact on the global economy (Mok et al. 2021) but it also includes education (Fitria 2021). The government issued several policies (Monica & Fitriawati 2021). During the COVID-19 pandemic, there is a social distancing policy aimed at minimizing the spread of COVID-19. COVID-19 is spreading very fast and is easily transmitted (Setiaji & Dinata 2020). The COVID-19 outbreak brought many urgent changes in various sectors (Khasanah et al. 2020). One of them is the education sector. The COVID-19 pandemic has transformed traditional ways of teaching and learning into transformative online teaching and learning (Armoed 2021). In March

2020 to early 2022, all educational activities were carried out in distance learning to prevent the spread of COVID-19, even for now some schools and universities are still implementing distance learning (Pertiwi et al. 2021). The existence of a social distancing policy that then became the basis for the implementation of learning from home, and the use of information technology that applies suddenly, thus making educators and learners shocked. (Maulidina & Bhakti 2020).

Learning is a teaching and learning activity that has various stages (Novianti & Syarkowi 2021) among others, namely planning, implementing, and evaluating (Pertiwi 2019). The learning stages are carried out by the teacher using learning media (Okyranida & Astuti 2020) the corresponding. Students can play an active role in following the instructions of the teacher during learning (Syarifudin 2020). Online learning is a learning system (Styawati et al. 2021) which is carried out by requiring tools to use internet access (Al-qoyyim et al. 2022). Online learning is undergoing a transition from traditional to innovative teaching from personal to virtual (Danchikov et al. 2021). The characteristics of online learning are utilizing electronic technology services and computer advantages (Widiya et al. 2020) to increase the likelihood that students can continue their learning activities (Yunitasari & Hanifah 2020). Technology becomes a means in the learning process (Pakpahan & Fitriani 2020). In online learning, students and teachers interact using video (Lapitan et al. 2021). Online learning with the use of the internet network can be carried out and followed for free or for a certain fee (Baety & Munandar 2021). The purpose of online learning is to provide quality learning services that are massive and open (Handarini & Wulandari 2020).

Physics is the study of a natural phenomenon (Dani & Qurana 2022) or inanimate objects in the living environment, space, and time and any interactions that accompany them (Fatimah et al. 2020). Physics education today metamorphoses from a simple exchange of knowledge to a more complex one with the presence of scientific investigations for students (Cai et al. 2021). Physics is also a science derived from observations and experiments, and also connects reality based on the scientific method (Jafar 2019). Physics is one branch of natural science that aims to study and provide understanding both qualitatively and quantitatively (Amin & Sulistiyono 2021). Physics can also be seen as processes and products (Rizaldi et al. 2021). Physics learning is often considered an abstract science presented in a less interesting theory and is considered an elusive and mastered science (Mayanti et al. 2022). Therefore, teachers as an educator needs to use various types of learning methods and models that are able to make it easier for students to understand the concepts of physics (Kurnia et al. 2022).

One model that can help (Harefa & Telukdalam 2021) students become easier to understand the concepts of physics is the discovery learning model. Discovery learning model is a model with a discussion process guided by teachers so that students can find and complete the period that has been given to achieve the goal of equality (Sahara et al. 2018). The discovery learning model is learning that is considered a promising learning model due to the active involvement of students in the learning process (Dwijayanti et al. 2020). Discovery learning model is also considered suitable because it can train the skills of learners (Nurfadillah et al. 2022). Discovery learning can facilitate student learning in studying physics (Yerimadesi et al. 2018). In this model, students are required to be independent through inventions (Amrianto & Lufri 2019). Based on this background, this study was conducted to analyze the application of discovery learning to physics learning during the COVID-19 pandemic in Indonesia.

Commented [RE2]: Is it true that harefa recommends the discovery model, check it out
Harefa, D & Telukdalam, P 2021, 'Penggunaan Model Pembelajaran Student Facilitator and Explaining Terhadap Hasil Belajar Fisika', *Jurnal Dinamika Pendidikan*, vol. 14, no. 1, pp. 116–131.

METHODS

This research uses literature studies. Secondary data from this study in the form of journals that can be accounted for well (Effendi et al. 2021) nationally and internationally related to discovery learning in physics learning during COVID-19 in Indonesia and other sources on the website (Suliyanah et al. 2021). The collected data will be analyzed using qualitative descriptive analysis using the Miles and Huberman model. (Turmuzi et al. 2021). Analysis of data according to Miles and Huberman will be shown in **FIGURE 1.**

Commented [RE3]: what journal category?accredited, reputation

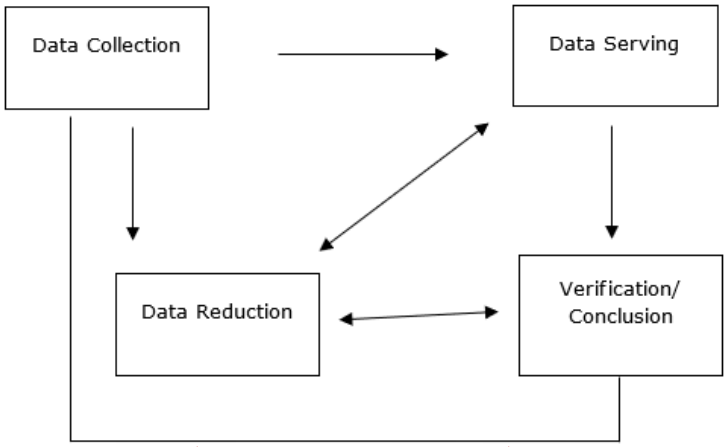

FIGURE 1. Qualitative Data Analysis

Commented [RE4]: How is the relationship between data collection and conclusion?

RESULTS AND DISCUSSION

The discovery learning model is a model that learns a fun concept and principle that requires students to be active, and creative (Susmiati 2020). The existence of the COVID-19 pandemic requires teachers to find solutions so that learning continues to run well until it achieves certain goals, one of which is by implementing discovery models in the implementation of physics learning. In this study, national and international journals related to discovery learning in physics learning during COVID-19 in Indonesia are shown in **TABLE 1.**

Model Discovery Learning

Commented [RE5]: determine the indicators/profile grids and discuss according to the findings in the journal on the application of learning during the covid period, with the result data obtained in the journal

Discovery learning is a learning model that usually uses constructivists based on inquiry theory of learning and occurs in problem-solving situations where learners will learn through already gained knowledge and previous experience to discover facts and relationships related to the new material studied (Simamora et al. 2019). Discovery learning is also a learning that invites students in it to solve problems for the development of knowledge and skills (Yuliana 2018). So, from some of these opinions, it can be concluded that discovery learning is a learning process that is not given as a whole but involves students to organize, develop knowledge, and skills that are useful for solving a problem.

According to Maharani (2017) there are several steps of the discovery learning learning model, namely: (1) Stimulation (stimulus or providing stimulation). Students will be given a problem at the beginning of learning so that students feel confused and curiosity will arise to investigate this matter. And the teacher will be a facilitator by giving a question and direction according to the discovery. (2) Problem statement (statement or problem identification). Here, the teacher gives the learner the opportunity to identify everything related to the events of the relevant problem. (3) Data collection. From the data collection, evidence related to existing evidence will be obtained so that students have the opportunity to obtain and collect various appropriate information. (4) Data processing. Students can process various data and information obtained previously. (5) Verification. Participants prove whether or not a pre-existing statement is true. (6) Generalization (generalization or drawing conclusions). Learners can draw conclusions that will be used as a general principle for all problems.

Characteristics of Discovery Learning

Discovery learning is a learning process that is not given as a whole but involves learners to organize, develop knowledge, and skills that are useful for solving a problem. There are several characteristics of the discovery learning learning model, namely: (1) emphasizing more on the learning process, not the teaching process, (2) encouraging students to be more independent, (3) paying attention to the attitudes and beliefs of students in learning, (4) providing opportunities for students to build new knowledge and understanding based on real experiences, (5) encouraging the development of curiosity naturally in students, (6) have the view that learning is a process, not pressing on results.

The purpose of using the discovery learning learning model in teaching and learning activities is to increase the involvement of students actively in obtaining and processing learning gains, directing students to continue to be learners, not making teachers the only source of information that students need, training students to explore and utilize their environment as a source that will continue to be explored (Fransiska et al. 2018).

Advantages of Discovery Learning in Physics Learning during COVID-19

The advantages of the discovery learning learning model are that it can help students to improve and improve cognitive skills and processes, can make students develop more according to their respective speeds, can increase the level of appreciation in students because of the results of discussions, is able to make students feel happy because they can carry out research, and can help students in dispelling doubts because it leads to the truth for sure (Yuliana 2018).

During COVID-19, the use of discovery learning learning models in physics learning in schools can increase students' understanding of student physics subjects (Dewi 2021). Based on previous research conducted by Praptama (2021) the advantage of using the discovery learning model in physics learning during COVID-19 is that it can increase student activity on temperature and heat materials. Based on previous research also conducted by Yuszahra (2018), it is known that the discovery learning model can improve cognitive abilities and can form disciplined and positive attitudes of participants during the COVID-19 pandemic.

During the COVID-19 pandemic, students have carried out remote learning so that teachers are looking for other solutions so that physics learning continues to run well One of the ways carried out by Sudarsana (2021) is by using physics e-modules based on an integrated discovery learning learning model website and obtained under the use of physics e-modules based on the discovery learning model can affect physics learning in the era COVID-19 pandemic. Another way is also done by Sulistyo (2021) , namely doing it using the WhatsApp application using a discovery learning model with a teacher-student approach can show a fairly effective relationship and can be an alternative solution in physics learning during the COVID-19 pandemic.

Disadvantages of Discovery Learning in Physics Learning during COVID-19

In addition to having advantages, of course, the discovery learning model also has several disadvantages, especially during the COVID-19 pandemic. The discovery learning model has its drawbacks, which can lead to the assumption that there is a readiness of the mind to learn, the use of this model can consume a lot of time, the application of discovery learning requires a resource-rich learning environment, and students often have difficulty in forming opinions, making predictions, or drawing conclusions, and some teachers are not necessarily able to manage discovery learning properly (Khasinah 2021). According to Yuliana (2018) discovery learning also has a drawback, namely that the discovery learning model is said to be not efficient enough to be used in teaching and

learning activities in a large number of students because this model takes a long time to solve a problem.

From previous research conducted by Andriani (2021) explained that the difficulties experienced by students during physics learning during this pandemic are the absence of internet quotas, difficulty understanding materials and teachers feel difficulties in delivering materials. Therefore, the implementation of the discovery learning model during the COVID-19 pandemic is not all effective in physics learning.

CONCLUSION

Commented [RE6]: research and future implications

From the results of the study using the literature study method related to the application of the discovery learning model to physics learning during the COVID-19 pandemic in Indonesia, it can be concluded that: 1) The application of the discovery learning model to physics learning during the COVID-19 pandemic can improve student understanding, students' critical thinking ability, and mastery of student concepts. 2) The use of online learning tools and discovery learning-based e-modules can improve students' mastery of concepts in physics learning during the COVID-19 pandemic. 3) The advantages of the discovery learning model in physics learning during the COVID-19 pandemic are that it can improve cognitive abilities and can form disciplined and positive attitudes of students. 4) The flexibility of the discovery learning model in physics learning during the COVID-19 pandemic is that students have difficulty understanding the material and teachers find it difficult to present the material so that the application of the discovery learning model in physics learning during the COVID-19 pandemic in Indonesia is not all effective.

ACKNOWLEDGMENT

The author's gratitude goes to the Directorate General of Higher Education, Research, and Technology; Ministry of Education, Culture, Research and Technology, Indonesia who has supported funding in *Penelitian Dasar Unggulan Perguruan Tinggi* - DRTPM 2022 [Contract Number: 29551/UN38.9/LK.04.00/2022].

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APPENDIX

TABLE 1. Relevant Research Results Application of the Discovery Learning Model in Physics Learning During the COVID-19 Pandemic.

No.	Author	Research Purposes	Research Result
1.	(Dewi 2021)	Improving the understanding of physics concepts in newton law students of class X MIA-1 SMA Negeri 3 Sibolga school year 2021-2022 by applying discovery learning methods through online learning.	With the implementation of discovery learning methods through online learning, students' understanding of student subjects has increased.
2.	(Gunawan et al. 2021)	Measuring the effectiveness of discovery learning-based learning tools with cognitive approaches and conflict approaches to student mastery of concepts.	The use of discovery learning-based learning tools using cognitive approaches and conflict approaches is effectively used to improve students' mastery of concepts.
3.	(Egista et al. 2022)	Develop a decent discovery learning model learning device to increase the mastery of learner concepts on harmonic vibration materials.	Learning devices using discovery learning models can increase the mastery of learner concepts.
4.	(Ramadoni et al. 2019)	Develop physics modules using an integrated value-based discovery learning model with a science process approach.	Physics modules using an integrated value-based discovery learning model with a science process approach can improve students' abilities and values.
5.	(Sarah 2021)	Describe the implementation of discovery learning by using personal sites in the physics classroom.	Discovery learning using a personal site improves student interaction and student learning outcomes during online learning.
6.	(Sulistyo & Kartono 2021)	Knowing the influence of the discovery learning model with the active learning teacher-student approach assisted by the WhatsApp application on learning during COVID-19.	The use of the discovery learning model with a teacher-student approach assisted by the WhatsApp application in the era of the COVID-19 pandemic shows a fairly effective relationship and can be an alternative solution.
7.	(Sudarsana et al. 2021)	Knowing the development of website integrated discovery learning-based physics modules is a necessity in physics learning due to the COVID-19 pandemic.	e-modules physics based on integrated discovery learning websites affect physics learning in the era of the COVID-19 pandemic.
8.	(Mahendra et al. 2018)	Develop physics high school student worksheets on temperature and heat materials based on discovery learning models based on metacognitives.	The use of physics LKS in high school students based on the discovery learning model can be said to be valid and can be used for the learning process. The use of LKS based on the discovery model can improve student learning outcomes.
9.	(Praptama et al. 2021)	Knowing the influence of the use of video media with discovery learning models on temperature and heat materials to increase student activity during COVID-19.	Learning using video media with discovery learning models on temperature and heat materials can increase student activity during COVID-19.
10.	(Andriani et al. 2021)	Knowing physics learning during the COVID-19 pandemic at SMA Negeri 1 Kuwus.	Physics teachers use the discovery model with online methods have not been maximized, students become less active.
11.	(Sartono 2019)	Describe the physics learning	With the application of the discovery

No.	Author	Research Purposes	Research Result
		process by applying the discovery learning model assisted by student worksheets.	learning model assisted by LKS, it can improve the learning achievement of student fluid matter physics.
12.	(Kusrini et al. 2018)	Describes the application of the discovery learning model assisted by power point media in class X science 3 students of SMA Negeri 2 Merauke.	Discovery learning models can make students more active and motivated to find solutions to the problems they get.
13.	(Yuszahra et al. 2018)	Knowing the application of discovery learning with e-learning media to learning during the COVID-19 period.	The discovery learning model can improve cognitive abilities and shape students' disciplined and positive attitudes during the COVID-19 period.
14.	(Saprudin et al. 2021)	Deciphering the results of studies related to the use of e-books in physics learning.	The use of e-books by applying the discovery learning model can increase students' interest and motivation to learn during online learning.
15.	(Ramadan et al. 2020)	Improving guided discovery-based online physics learning tools for class X students.	Guided discovery-based online physics learning tools are worth using for online learning of momentum and impulse materials during the COVID-19 pandemic.
16.	(Idrus et al. 2021)	Develop a web-based physics e-module using a discovery learning model on newton's law material.	The use of web-based physics e-modules using the discovery learning model on Newton's law can be said to be feasible and valid for learning during the COVID-19 pandemic.
17.	(Maulidiyah et al. 2020)	Improving discovery learning-based e-learning using schoology in physics learning.	The development of e-learning based on the discovery learning model is feasible to be used in physics learning for high school students.
18.	(Serevina & Luthfi 2021)	Develop discovery learning-based online learning tools on momentum and impulse.	Discovery learning-based online learning tools on the concept of momentum and impulse are right to use.
19.	(Masril et al. 2019)	Knowing the effect of virtual laboratory implementation using the discovery learning model in high school.	With the implementation of virtual laboratories using the discovery learning model can improve the competence of students' skills.
20.	(Kasmiana et al. 2020)	Knowing the influence of guided discovery learning models in understanding student concepts.	The use of guided discovery learning models can improve student learning outcomes and understanding of student concepts.
21.	(Irma et al. 2021)	Analyzing the influence of the Discovery Based Unity of Science model with sets approach to the critical thinking skills of students during the COVID-19 pandemic.	The use of the Discovery Based Unity of Science learning model with the SETS approach can improve students' critical thinking skills during the COVID-19 pandemic.
22.	(Hikmawati et al. 2021)	Describes the effectiveness of the discovery learning model to train the science process skills of class XI SMA Negeri 1 Kediri students related to elasticity material and hooke law.	The application of the discovery learning model is effectively used in physics learning and can improve students' science process skills related to elasticity matter and hooke laws.
23.	(Yoesoef 2022)	Increase activity and meaningful learning of physics from home with a level of inquiry discovery learning.	The application of the level of inquiry discovery learning model can increase student activities and meaningful learning experiences in physics from home during the COVID-19 pandemic.
24.	(Safira et al. 2021)	Knowing the effect of the implementation of the Guided	The implementation of the Guided Discovery Learning Assisted Video and

No.	Author	Research Purposes	Research Result
		Discovery Learning Assisted Video and Interactive Simulation (GDM-VIS) model in physics learning.	Interactive Simulation (GDM-VIS) model can improve students' understanding of concepts.
25.	(Khovivah et al. 2021)	Knowing the improvement of student learning outcomes on light matter using the discovery learning model.	Learning using the discovery learning model can improve student learning outcomes on light material during a pandemic.
26.	(Awaliyah Rizky & Budi Bhakti 2021)	Develop physics modules using discovery learning models on energy subjects.	The development of physics modules using the discovery learning model on the subject matter of energy is said to be valid and can be used for physics learning.
27.	(Lidiana et al. 2018)	Knowing the effect of discovery learning using PhET on physics learning outcomes of grade II students of SMAN 1 Kediri for the 2017/2018 Academic Year.	The use of discovery learning models using PhET can improve student physics learning outcomes.
28.	(Septi et al. 2022)	Knowing the influence of discovery learning models on students' science process skills on physics subjects.	Discovery learning models can improve students' science process skills in physics subjects.
29.	(Salsabila et al. 2019)	Knowing the effect of the implementation of the discovery learning learning model on elasticity material and hooke's law on physics learning outcomes of high school students.	The implementation of the discovery learning learning model on elasticity material and hooke's law can improve the physics learning outcomes of high school students.
30.	(Suryanti et al. 2021)	Knowing the influence of the discovery learning model on the mastery of concepts and physics knowledge of high school students.	Discovery learning models can improve high school students' mastery of physics concepts and knowledge.

Research Profile of Discovery Learning in Physics Learning During the COVID-19 Pandemic

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Abstract

This research aims to analyze the application of discovery learning to physics learning during the COVID-19 pandemic. This research method is a study of literature and journals as many as ten journals that can be accounted for related to the application of discovery learning research models to physics learning during the COVID-19 pandemic in Indonesia. The study was analyzed using qualitative descriptive analysis with paper review technique. It was concluded that: 1) The application of the discovery learning model to physics learning during the COVID-19 pandemic can improve student understanding, students' critical thinking ability, and mastery of student concepts. 2) The use of online learning tools and discovery learning-based e-modules can improve students' mastery of concepts in physics learning during the COVID-19 pandemic. 3) The advantages of the discovery learning model in physics learning during the COVID-19 pandemic are that it can improve cognitive abilities and can form disciplined and positive attitudes of students. 4) The flexibility of the discovery learning model in physics learning during the COVID-19 pandemic is that students have difficulty understanding the material and teachers find it difficult to present the material so that the application of the discovery learning model in physics learning during the COVID-19 pandemic in Indonesia is not all effective.

Keywords: COVID-19 Pandemic, Discovery Learning, Physics Learning

INTRODUCTION

The COVID-19 pandemic is becoming global at this time (Ibrahim et al. 2020). The COVID-19 pandemic caused many unexpected global challenges for different countries (Ametepe & Khan 2021) one of them is Indonesia (Fajri et al. 2021). Information about COVID-19 from various news stories grabbed the attention of the world community (Hakim & Mulyapradana 2020). The COVID-19 pandemic has not only had a devastating impact on the global economy (Mok et al. 2021) but it also includes education (Fitria 2021). The government issued several policies (Monica & Fitriawati 2021). During the COVID-19 pandemic, there is a social distancing policy aimed at minimizing the spread of COVID-19. COVID-19 is spreading very fast and is easily transmitted (Setiaji & Dinata 2020). The COVID-19 outbreak brought many urgent changes in various sectors (Khasanah et al. 2020). One of them is the education sector. The COVID-19 pandemic has transformed traditional ways of teaching and learning into transformative online teaching and learning (Armoed 2021). In March

2020 to early 2022, all educational activities were carried out in distance learning to prevent the spread of COVID-19, even for now some schools and universities are still implementing distance learning (Pertiwi et al. 2021). The existence of a social distancing policy that then became the basis for the implementation of learning from home, and the use of information technology that applies suddenly, thus making educators and learners shocked. (Maulidina & Bhakti 2020).

Learning is a teaching and learning activity that has various stages (Novianti & Syarkowi 2021) among others, namely planning, implementing, and evaluating (Pertiwi 2019). The learning stages are carried out by the teacher using learning media (Okyranida & Astuti 2020) the corresponding. Students can play an active role in following the instructions of the teacher during learning (Syarifudin 2020). Online learning is a learning system (Styawati et al. 2021) which is carried out by requiring tools to use internet access (Al-qoyyim et al. 2022). Online learning is undergoing a transition from traditional to innovative teaching from personal to virtual (Danchikov et al. 2021). The characteristics of online learning are utilizing electronic technology services and computer advantages (Widiya et al. 2020) to increase the likelihood that students can continue their learning activities (Yunitasari & Hanifah 2020). Technology becomes a means in the learning process (Pakpahan & Fitriani 2020). In online learning, students and teachers interact using video (Lapitan et al. 2021). Online learning with the use of the internet network can be carried out and followed for free or for a certain fee (Baety & Munandar 2021). The purpose of online learning is to provide quality learning services that are massive and open (Handarini & Wulandari 2020).

Physics is the study of a natural phenomenon (Dani & Qurana 2022) or inanimate objects in the living environment, space, and time and any interactions that accompany them (Fatimah et al. 2020). Physics education today metamorphoses from a simple exchange of knowledge to a more complex one with the presence of scientific investigations for students (Cai et al. 2021). Physics is also a science derived from observations and experiments, and also connects reality based on the scientific method (Jafar 2019). Physics is one branch of natural science that aims to study and provide understanding both qualitatively and quantitatively (Amin & Sulistiyono 2021). Physics can also be seen as processes and products (Rizaldi et al. 2021). Physics learning is often considered an abstract science presented in a less interesting theory and is considered an elusive and mastered science (Mayanti et al. 2022). Therefore, teachers as an educator needs to use various types of learning methods and models that are able to make it easier for students to understand the concepts of physics (Kurnia et al. 2022).

One model that can help students become easier to understand the concepts of physics is the discovery learning model (Harefa 2021). Discovery learning model is a model with a discussion process guided by teachers so that students can find and complete the period that has been given to achieve the goal of equality (Sahara et al. 2018). The discovery learning model is learning that is considered a promising learning model due to the active involvement of students in the learning process (Dwijayanti et al. 2020). Discovery learning model is also considered suitable because it can train the skills of learners (Nurfadillah et al. 2022). Discovery learning can facilitate student learning in studying physics (Yerimadesi et al. 2018). In this model, students are required to be independent through inventions (Amrianto & Lufri 2019). Based on this background, this study was conducted to analyze the application of discovery learning to physics learning during the COVID-19 pandemic in Indonesia.

METHODS

This research uses literature studies. Secondary data from this study in the form of journals that can be accounted for well (Effendi et al. 2021) nationally and internationally accredited by SINTA regarding discovery learning in physics learning during COVID-19 in Indonesia and other sources on the website (Suliyanah et al. 2021). The collected data will be analyzed using qualitative descriptive analysis using the Miles and Huberman model. (Turmuzi et al. 2021). Analysis of data according to Miles and Huberman will be shown in **FIGURE 1.**

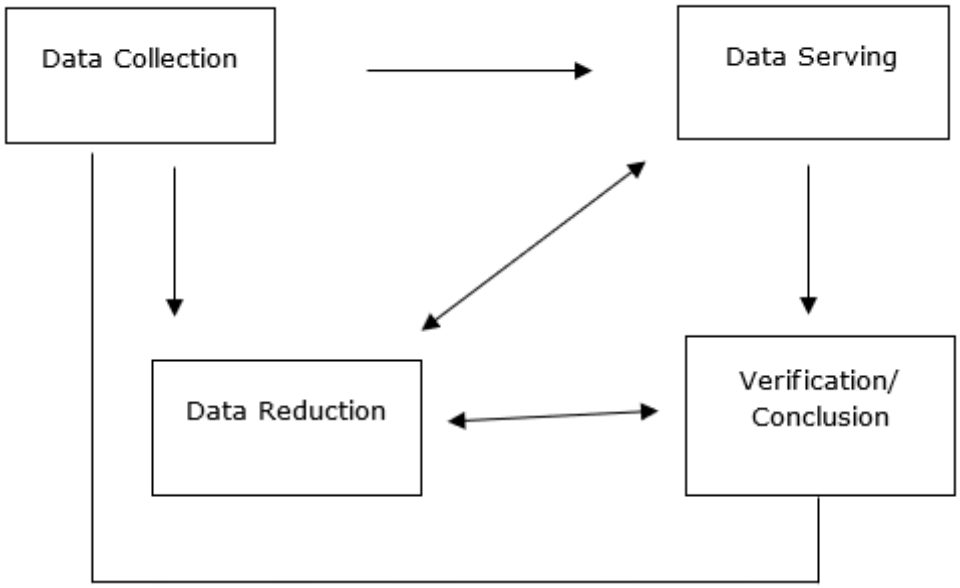

FIGURE 1. Qualitative Data Analysis

The relationship between data collection and conclusions is that after getting the data, then conclusions are made to get answers from the research objectives. Data collections being the primer data that will deeply explore to answers and finding the novelties of the research. Hence, this the research will have a few conclusion that are answers the research objective.

RESULTS AND DISCUSSION

The discovery learning model is a model that learns a fun concept and principle that requires students to be active, and creative (Susmiati 2020). The existence of the COVID-19 pandemic requires teachers to find solutions so that learning continues to run well until it achieves certain goals, one of which is by implementing discovery models in the implementation of physics learning. In this study, national and international journals related to discovery learning in physics learning during COVID-19 in Indonesia are shown in **TABLE 1.**

Model Discovery Learning

Discovery learning is a learning model that usually uses constructivists based on inquiry theory of learning and occurs in problem-solving situations where learners will learn through already gained knowledge and previous experience to discover facts and relationships related to the new material studied (Simamora et al. 2019). Discovery learning is also a learning that invites students in it to solve problems for the development of knowledge and skills (Yuliana 2018). So, from some of these opinions, it can be concluded that discovery learning is a learning process that is not given as a whole but involves students to organize, develop knowledge, and skills that are useful for solving a problem.

According to Maharani (2017) there are several steps of the discovery learning learning model, namely: (1) Stimulation (stimulus or providing stimulation). Students will be given a problem at the beginning of learning so that students feel confused and curiosity will arise to investigate this matter. And the teacher will be a facilitator by giving a question and direction according to the discovery. (2) Problem statement (statement or problem identification). Here, the teacher gives the learner the opportunity to identify everything related to the events of the relevant problem. (3) Data collection. From the data collection, evidence related to existing evidence will be obtained so that students have the opportunity to obtain and collect various appropriate information. (4) Data processing. Students can process various data and information obtained previously. (5) Verification. Participants prove

whether or not a pre-existing statement is true. (6) Generalization (generalization or drawing conclusions). Learners can draw conclusions that will be used as a general principle for all problems. From Maharani, it was found that by using the discovery learning model, it can improve student learning outcomes.

Characteristics of Discovery Learning

Discovery learning is a learning process that is not given as a whole but involves learners to organize, develop knowledge, and skills that are useful for solving a problem. There are several characteristics of the discovery learning learning model, namely: (1) emphasizing more on the learning process, not the teaching process, (2) encouraging students to be more independent, (3) paying attention to the attitudes and beliefs of students in learning, (4) providing opportunities for students to build new knowledge and understanding based on real experiences, (5) encouraging the development of curiosity naturally in students, (6) have the view that learning is a process, not pressing on results.

The purpose of using the discovery learning learning model in teaching and learning activities is to increase the involvement of students actively in obtaining and processing learning gains, directing students to continue to be learners, not making teachers the only source of information that students need, training students to explore and utilize their environment as a source that will continue to be explored (Fransiska et al. 2018).

Advantages of Discovery Learning in Physics Learning during COVID-19

The advantages of the discovery learning learning model are that it can help students to improve and improve cognitive skills and processes, can make students develop more according to their respective speeds, can increase the level of appreciation in students because of the results of discussions, is able to make students feel happy because they can carry out research, and can help students in dispelling doubts because it leads to the truth for sure (Yuliana 2018).

During COVID-19, the use of discovery learning learning models in physics learning in schools can increase students' understanding of student physics subjects (Dewi 2021). Based on previous research conducted by Praptama (2021) the advantage of using the discovery learning model in physics learning during COVID-19 is that it can increase student activity on temperature and heat materials. Based on previous research also conducted by Yuszahra (2018), it is known that the discovery learning model can improve cognitive abilities and can form disciplined and positive attitudes of participants during the COVID-19 pandemic.

During the COVID-19 pandemic, students have carried out remote learning so that teachers are looking for other solutions so that physics learning continues to run well One of the ways carried out by Sudarsana (2021) is by using physics e-modules based on an integrated discovery learning learning model website and obtained under the use of physics e-modules based on the discovery learning model can affect physics learning in the era COVID-19 pandemic. Another way is also done by Sulistyo (2021) , namely doing it using the WhatsApp application using a discovery learning model with a teacher-student approach can show a fairly effective relationship and can be an alternative solution in physics learning during the COVID-19 pandemic.

Disadvantages of Discovery Learning in Physics Learning during COVID-19

In addition to having advantages, of course, the discovery learning model also has several disadvantages, especially during the COVID-19 pandemic. The discovery learning model has its drawbacks, which can lead to the assumption that there is a readiness of the mind to learn, the use of this model can consume a lot of time, the application of discovery learning requires a resource-rich learning environment, and students often have difficulty in forming opinions, making predictions, or

drawing conclusions, and some teachers are not necessarily able to manage discovery learning properly (Khasinah 2021). According to Yuliana (2018) discovery learning also has a drawback, namely that the discovery learning model is said to be not efficient enough to be used in teaching and learning activities in a large number of students because this model takes a long time to solve a problem.

From previous research conducted by Andriani (2021) explained that the difficulties experienced by students during physics learning during this pandemic are the absence of internet quotas, difficulty understanding materials and teachers feel difficulties in delivering materials. Therefore, the implementation of the discovery learning model during the COVID-19 pandemic is not all effective in physics learning.

CONCLUSION

From the results of the study using the literature study method related to the application of the discovery learning model to physics learning during the COVID-19 pandemic in Indonesia, it can be concluded that: 1) The application of the discovery learning model to physics learning during the COVID-19 pandemic can improve student understanding, students' critical thinking ability, and mastery of student concepts. 2) The use of online learning tools and discovery learning-based e-modules can improve students' mastery of concepts in physics learning during the COVID-19 pandemic. 3) The advantages of the discovery learning model in physics learning during the COVID-19 pandemic are that it can improve cognitive abilities and can form disciplined and positive attitudes of students. 4) The flexibility of the discovery learning model in physics learning during the COVID-19 pandemic is that students have difficulty understanding the material and teachers find it difficult to present the material so that the application of the discovery learning model in physics learning during the COVID-19 pandemic in Indonesia is not all effective.

The limitation of this research is that it only uses the discovery learning model in general. The implications for further research can be to develop and refine discovery learning models in the future.

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APPENDIX

TABLE 1. Relevant Research Results Application of the Discovery Learning Model in Physics Learning During the COVID-19 Pandemic.

No.	Author	Research Purposes	Research Result
1.	(Dewi 2021)	Improving the understanding of physics concepts in newton law students of class X MIA-1 SMA Negeri 3 Sibolga school year 2021-2022 by applying discovery learning methods through online learning.	With the implementation of discovery learning methods through online learning, students' understanding of student subjects has increased.
2.	(Gunawan et al. 2021)	Measuring the effectiveness of discovery learning-based learning tools with cognitive approaches and conflict approaches to student mastery of concepts.	The use of discovery learning-based learning tools using cognitive approaches and conflict approaches is effectively used to improve students' mastery of concepts.
3.	(Egista et al. 2022)	Develop a decent discovery learning model learning device to increase the mastery of learner concepts on harmonic vibration materials.	Learning devices using discovery learning models can increase the mastery of learner concepts.
4.	(Ramadoni et al. 2019)	Develop physics modules using an integrated value-based discovery learning model with a science process approach.	Physics modules using an integrated value-based discovery learning model with a science process approach can improve students' abilities and values.
5.	(Sarah 2021)	Describe the implementation of discovery learning by using personal sites in the physics classroom.	Discovery learning using a personal site improves student interaction and student learning outcomes during online learning.
6.	(Sulistyo & Kartono 2021)	Knowing the influence of the discovery learning model with the active learning teacher-student approach assisted by the WhatsApp application on learning during COVID-19.	The use of the discovery learning model with a teacher-student approach assisted by the WhatsApp application in the era of the COVID-19 pandemic shows a fairly effective relationship and can be an alternative solution.
7.	(Sudarsana et al. 2021)	Knowing the development of website integrated discovery learning-based physics modules is a necessity in physics learning due to the COVID-19 pandemic.	e-modules physics based on integrated discovery learning websites affect physics learning in the era of the COVID-19 pandemic.
8.	(Mahendra et al. 2018)	Develop physics high school student worksheets on temperature and heat materials based on discovery learning models based on metacognitives.	The use of physics LKS in high school students based on the discovery learning model can be said to be valid and can be used for the learning process. The use of LKS based on the discovery model can improve student learning outcomes.
9.	(Praptama et al. 2021)	Knowing the influence of the use of video media with discovery learning models on temperature and heat materials to increase student activity during COVID-19.	Learning using video media with discovery learning models on temperature and heat materials can increase student activity during COVID-19.
10.	(Andriani et al. 2021)	Knowing physics learning during the COVID-19 pandemic at SMA Negeri 1 Kuwus.	Physics teachers use the discovery model with online methods have not been maximized, students become less active.
11.	(Sartono 2019)	Describe the physics learning process by applying the discovery learning model assisted by student	With the application of the discovery learning model assisted by LKS, it can improve the learning achievement of

No.	Author	Research Purposes	Research Result
		worksheets.	student fluid matter physics.
12.	(Kusrini et al. 2018)	Describes the application of the discovery learning model assisted by power point media in class X science 3 students of SMA Negeri 2 Merauke.	Discovery learning models can make students more active and motivated to find solutions to the problems they get.
13.	(Yuszahra et al. 2018)	Knowing the application of discovery learning with e-learning media to learning during the COVID-19 period.	The discovery learning model can improve cognitive abilities and shape students' disciplined and positive attitudes during the COVID-19 period.
14.	(Saprudin et al. 2021)	Deciphering the results of studies related to the use of e-books in physics learning.	The use of e-books by applying the discovery learning model can increase students' interest and motivation to learn during online learning.
15.	(Ramadan et al. 2020)	Improving guided discovery-based online physics learning tools for class X students.	Guided discovery-based online physics learning tools are worth using for online learning of momentum and impulse materials during the COVID-19 pandemic.
16.	(Idrus et al. 2021)	Develop a web-based physics e-module using a discovery learning model on newton's law material.	The use of web-based physics e-modules using the discovery learning model on Newton's law can be said to be feasible and valid for learning during the COVID-19 pandemic.
17.	(Maulidiyah et al. 2020)	Improving discovery learning-based e-learning using schoology in physics learning.	The development of e-learning based on the discovery learning model is feasible to be used in physics learning for high school students.
18.	(Serevina & Luthfi 2021)	Develop discovery learning-based online learning tools on momentum and impulse.	Discovery learning-based online learning tools on the concept of momentum and impulse are right to use.
19.	(Masril et al. 2019)	Knowing the effect of virtual laboratory implementation using the discovery learning model in high school.	With the implementation of virtual laboratories using the discovery learning model can improve the competence of students' skills.
20.	(Kasmiana et al. 2020)	Knowing the influence of guided discovery learning models in understanding student concepts.	The use of guided discovery learning models can improve student learning outcomes and understanding of student concepts.
21.	(Irma et al. 2021)	Analyzing the influence of the Discovery Based Unity of Science model with sets approach to the critical thinking skills of students during the COVID-19 pandemic.	The use of the Discovery Based Unity of Science learning model with the SETS approach can improve students' critical thinking skills during the COVID-19 pandemic.
22.	(Hikmawati et al. 2021)	Describes the effectiveness of the discovery learning model to train the science process skills of class XI SMA Negeri 1 Kediri students related to elasticity material and hooke law.	The application of the discovery learning model is effectively used in physics learning and can improve students' science process skills related to elasticity matter and hooke laws.
23.	(Yoesoef 2022)	Increase activity and meaningful learning of physics from home with a level of inquiry discovery learning.	The application of the level of inquiry discovery learning model can increase student activities and meaningful learning experiences in physics from home during the COVID-19 pandemic.
24.	(Safira et al. 2021)	Knowing the effect of the implementation of the Guided Discovery Learning Assisted Video and Interactive Simulation	The implementation of the Guided Discovery Learning Assisted Video and Interactive Simulation (GDM-VIS) model can improve students' understanding of

No.	Author	Research Purposes	Research Result
		(GDM-VIS) model in physics learning.	concepts.
25.	(Khovivah et al. 2021)	Knowing the improvement of student learning outcomes on light matter using the discovery learning model.	Learning using the discovery learning model can improve student learning outcomes on light material during a pandemic.
26.	(Awaliyah Rizky & Budi Bhakti 2021)	Develop physics modules using discovery learning models on energy subjects.	The development of physics modules using the discovery learning model on the subject matter of energy is said to be valid and can be used for physics learning.
27.	(Lidiana et al. 2018)	Knowing the effect of discovery learning using PhET on physics learning outcomes of grade II students of SMAN 1 Kediri for the 2017/2018 Academic Year.	The use of discovery learning models using PhET can improve student physics learning outcomes.
28.	(Septi et al. 2022)	Knowing the influence of discovery learning models on students' science process skills on physics subjects.	Discovery learning models can improve students' science process skills in physics subjects.
29.	(Salsabila et al. 2019)	Knowing the effect of the implementation of the discovery learning learning model on elasticity material and hooke's law on physics learning outcomes of high school students.	The implementation of the discovery learning learning model on elasticity material and hooke's law can improve the physics learning outcomes of high school students.
30.	(Suryanti et al. 2021)	Knowing the influence of the discovery learning model on the mastery of concepts and physics knowledge of high school students.	Discovery learning models can improve high school students' mastery of physics concepts and knowledge.

Author Response of Editor and Reviewer Comments

A. Editor Comments

Editor Comments	Author Response
1. Our decision is: Revisions Required 2. Please Revise your paper and fill the author responses form, for the First Reviewer also attach review file. 3. Attach your revision and author responses in the OJS system in the revision section	Thank you for the review and decision. The author will immediately send the revised file to the relevant OJS in response to the revised revision.

B. Reviewer 1 Comments

No.	Reviewer Comments	Author Response
1.	Comments for title: Good	Thanks for the comments
2.	Comments for the abstract and the keywords: Data analysis technique?	Thanks for the comments. The analysis technique has been corrected
3.	Comments for introduction: Is it true that harefa recommends the discovery model, check it out Harefa, D & Telukdalam, P 2021, 'Penggunaan Model Pembelajaran Student Facilitator and Explaining Terhadap Hasil Belajar Fisika', Jurnal Dinamika Pendidikan, vol. 14, no. 1, pp. 116–131.	Thank you for the review, the citation has been corrected
4.	Comments for methodology: How is the relationship between data collection and conclusion?	Thanks for the comments, the relationship between the data collection and the conclusion has been added
5.	Comments for results and discussion: Determine the indicators/profile grids and discuss according to the findings in the journal on the application of learning during the	Thank you to the reviewers who have given positive recommendations for our articles

	covid period, with the result data obtained in the journal	
6.	Comments for summary: Research and future implications	Thank you to the reviewers who have given positive recommendations for our articles. Researchers have added future implications
7.	Comments for reference: Good	Thanks for the comments
8.	Additional comments to author: See Comment	Thanks for the comments

C. Reviewer 2 Comments

No.	Reviewer Comments	Author Response
1.	Comments for title: The title has been compiled briefly, clearly, in accordance with the contents of the article and relevant to the scope of JPPPF	Thank you to the reviewers who have given positive recommendations for our articles
2.	Comments for the abstract and the keywords: The abstract component is fulfilled. and the keyword is correct	Thank you to the reviewers who have given positive recommendations for our articles
3.	Comments for introduction: Introduction is supported by the latest and relevant articles There is something new that will be presented in this article	Thank you to the reviewers who have given positive recommendations for our articles
4.	Comments for methodology: The methodology has been presented in full	Thank for the comments
5.	Comments for results and discussion: The data is not presented properly Table 1 was not found in the article In the abstract, it is explained that the data presented are only the results of studies from 10 articles. The number of articles	Thank you to the reviewers who have given positive recommendations for our articles

	analyzed is very less because it is at least 30 articles.	
6.	Comments for summary: Not relevant to the data and discussion	Thank you to the reviewers who have given positive recommendations for our articles
7.	Comments for reference: References to data sources are still lacking. Literature review is carried out from at least 30 relevant references. References are written using the existing system in word	Thank you to the reviewers who have given positive recommendations for our articles
8.	Additional comments to author: Revise according to the suggestions given	Thank for the comments

D. Reviewer 3 Comments

No.	Reviewer Comments	Author Response
9.	Comments for title: it clear	Thank for the comments
10.	Comments for the abstract and the keywords: It repeat during the COVID-19 6 times. It will be better to reduce it	Thank you to the reviewers who have given positive recommendations for our articles
11.	Comments for introduction: it clear	Thank for the comments
12.	Comments for methodology: it clear	Thank for the comments
13.	Comments for results and discussion: The discussion is quite not that comprehensive I think it will be better to put which article is become the main source	Thank you to the reviewers who have given positive recommendations for our articles
14.	Comments for summary: Conclusion is not clearly stated. It need to answer the aims for this research	Thank you to the reviewers who have given positive recommendations for our articles
15.	Comments for reference: Conclusion is not clearly stated. It need to answer the aims for this research	Thank you to the reviewers who have given positive recommendations for our articles
16.	Additional comments to author:	Thank for the comments

	Revision	

Binar Kurnia Prahani <binarprahani@unesa.ac.id>

Invoice of accepted manuscript

2 messages

JPPPF <jpppf@unj.ac.id> Fri, Nov 4, 2022 at 6:02 PM
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Please check the attached invoices to move your manuscript process to publication.

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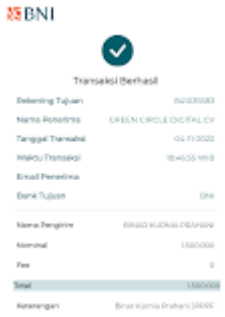

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Dear Editor

We did it.

Thank you very much

Best Regards,

Dr. Binar Kurnia Prahani
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November 4, 2022

LETTER OF ACCEPTANCE
Code Number: 24/JPPPF/2022

to
Binar Kurnia Prahani
Universitas Negeri Surabaya

Dear Author,
It is our pleasure to inform that, after the review process and approved title, the paper,

Research Profile of Discovery Learning in Physics Learning During the COVID-19 Pandemic
All Authors: Binar Kurnia Prahani, Budi Jatmiko, Tan Amelia, Shalsa Billa Ardhana Neswary, Kirana Aureola Arzak, Nova Allysa Qotrunnada

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Research Profile of Discovery Learning in Physics Learning During the COVID-19 Pandemic

Binar Kurnia Prahani[1,a)], Budi Jatmiko[1], Tan Amelia[2], Shalsa Billa Ardhana Neswary[1], Kirana Aureola Arzak[1], Nova Allysa Qotrunnada[1]

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Abstract

This research aims to analyze the application of discovery learning to physics learning during the COVID-19 pandemic. This research method is a study of literature and journals, as many as ten journals that can be accounted for related to the application of discovery learning research models to physics learning during the COVID-19 pandemic in Indonesia. The study was analyzed using qualitative descriptive analysis with paper review technique. It was concluded that: 1) The application of the discovery learning model to physics learning during the COVID-19 pandemic can improve student understanding, students' critical thinking ability, and mastery of student concepts. 2) The use of online learning tools and discovery learning-based e-modules can improve students' mastery of concepts in physics learning during the COVID-19 pandemic. 3) The advantages of the discovery learning model in physics learning during the COVID-19 pandemic are that it can improve cognitive abilities and form students' disciplined and positive attitudes. 4) The flexibility of the discovery learning model in physics learning during the COVID-19 pandemic is that students have difficulty understanding the material, and teachers find it difficult to present the material, so the application of the discovery learning model in physics learning during the COVID-19 pandemic in Indonesia is not all effective.

Keywords: COVID-19 pandemic, discovery learning, physics learning

INTRODUCTION

The COVID-19 pandemic is now becoming global (Ibrahim et al. 2020). The COVID-19 pandemic caused many unexpected global challenges for different countries (Ametepe & Khan 2021). One of them is Indonesia (Fajri et al. 2021). Information about COVID-19 from various news stories grabbed the attention of the world community (Hakim & Mulyapradana 2020). The COVID-19 pandemic has not only had a devastating impact on the global economy (Mok et al. 2021) but it also includes education (Fitria 2021). The government issued several policies (Monica & Fitriawati 2021). During the COVID-19 pandemic, there is a social distancing policy aimed at minimizing the spread of COVID-19. COVID-19 spreads quickly and is easily transmitted (Setiaji & Dinata 2020). The COVID-19 outbreak brought many urgent changes in various sectors (Khasanah et al. 2020). One of them is the education sector. The COVID-19 pandemic has transformed traditional ways of teaching and learning into transformative online teaching and learning (Armoed 2021). In March 2020 to early 2022, all

educational activities were carried out in distance learning to prevent the spread of COVID-19. Even now, some schools and universities are still implementing distance learning (Pertiwi et al. 2021). The existence of a social distancing policy that then became the basis for implementing learning from home, and the use of information technology that applies suddenly, thus shocking educators and learners. (Maulidina & Bhakti 2020).

Learning is a teaching and learning activity that has various stages (Novianti & Syarkowi 2021) among others, namely planning, implementing, and evaluating (Pertiwi 2019). The teacher carries out the learning stages using learning media (Okyranida & Astuti 2020) the corresponding. Students can play an active role in following the teacher's instructions during learning (Syarifudin 2020). Online learning is a learning system (Styawati et al. 2021) that requires tools to use internet access (Al-qoyyim et al. 2022). Online learning is transitioning from traditional to innovative teaching from personal to virtual (Danchikov et al. 2021). The characteristics of online learning are utilizing electronic technology services and computer advantages (Widiya et al. 2020) to increase the likelihood that students can continue their learning activities (Yunitasari & Hanifah 2020). Technology becomes a means in the learning process (Pakpahan & Fitriani 2020). In online learning, students and teachers interact using video (Lapitan et al. 2021). Online learning using the internet network can be carried out and followed for free or a certain fee (Baety & Munandar 2021). The purpose of online learning is to provide quality learning services that are massive and open (Handarini & Wulandari 2020).

Physics studies a natural phenomenon (Dani & Qurana 2022) or inanimate objects in the living environment, space, and time and any interactions that accompany them (Fatimah et al. 2020). Physics education today metamorphoses from a simple exchange of knowledge to a more complex one with the presence of scientific investigations for students (Cai et al. 2021). Physics is also a science derived from observations and experiments and connects reality based on the scientific method (Jafar 2019). Physics is one branch of natural science that aims to study and provide qualitative and quantitative understanding (Amin & Sulistiyono 2021). Physics can also be seen as processes and products (Rizaldi et al. 2021). Physics learning is often considered an abstract science presented in a less interesting theory and is considered an elusive and mastered science (Mayanti et al. 2022). Therefore, teachers need to use various learning methods and models that can make it easier for students to understand the concepts of physics (Kurnia et al. 2022).

One model that can help students understand physics concepts easier is the discovery learning model (Harefa 2021). The discovery learning model is a model with a discussion process guided by teachers so that students can find and complete the period given to achieve equality (Sahara et al. 2018). The discovery learning model is considered a promising learning model due to the active involvement of students in the learning process (Dwijayanti et al. 2020). The discovery learning model is also considered suitable because it can train learners' skills (Nurfadillah et al. 2022). Discovery learning can facilitate student learning in studying physics (Yerimadesi et al. 2018). In this model, students are required to be independent through inventions (Amrianto & Lufri 2019). Based on this background, this study was conducted to analyze the application of discovery learning to physics learning during the COVID-19 pandemic in Indonesia.

METHODS

This research uses literature studies. Secondary data from this study in the form of journals that can be accounted for well (Effendi et al. 2021) nationally and internationally accredited by SINTA regarding discovery learning in physics learning during COVID-19 in Indonesia and other sources on the website (Suliyanah et al. 2021). The collected data will be analyzed using qualitative descriptive analysis using the Miles and Huberman model. (Turmuzi et al. 2021). Data analysis according to Miles and Huberman will be shown in FIGURE 1.

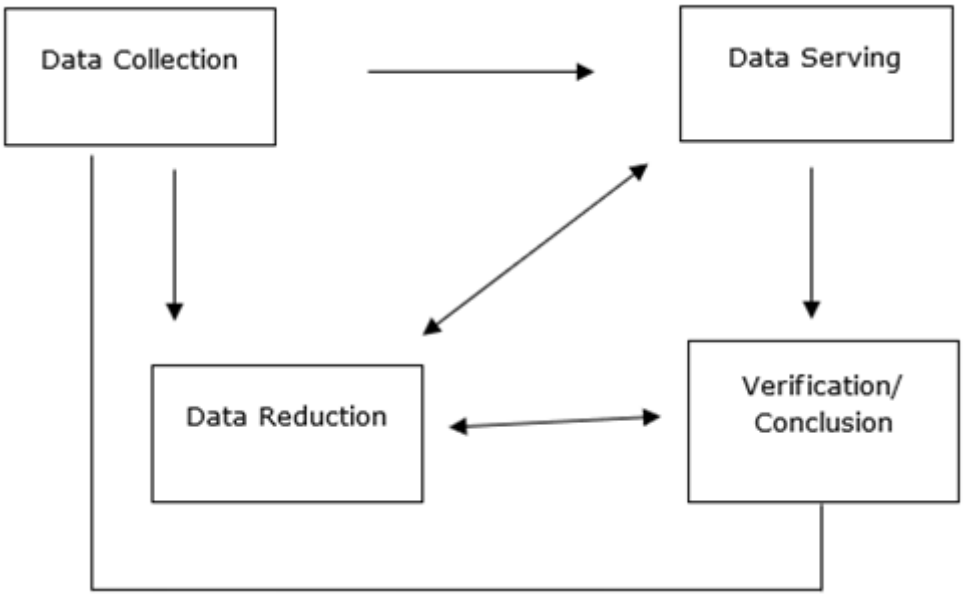

FIGURE 1. Qualitative Data Analysis

The relationship between data collection and conclusions is that after getting the data, then conclusions are made to get answers from the research objectives. Data collection is the primer data that will deeply explore answers and find the novelties of the research. Hence, this research will have a few conclusion that answer the research objective

RESULTS AND DISCUSSION

The discovery learning model is a model that learns a fun concept and principle that requires students to be active, and creative (Susmiati 2020). The existence of the COVID-19 pandemic requires teachers to find solutions so that learning continues to run well until it achieves certain goals, one of which is by implementing discovery models in the implementation of physics learning. In this study, national and international journals related to discovery learning in physics learning during COVID-19 in Indonesia are shown in TABLE 1.

TABLE 1. Relevant Research Results Application of the Discovery Learning Model in Physics Learning During the COVID-19 Pandemic.

No.	Author	Research Purposes	Research Result
1.	(Dewi 2021)	Improving the understanding of physics concepts in newton law students of class X MIA-1 SMA Negeri 3 Sibolga school year 2021-2022 by applying discovery learning methods through online learning.	With the implementation of discovery learning methods through online learning, students' understanding of student subjects has increased.
2.	(Gunawan et al. 2021)	Measuring the effectiveness of discovery learning-based learning tools with cognitive approaches and conflict approaches to student mastery of concepts.	The use of discovery learning-based learning tools using cognitive approaches and conflict approaches is effectively used to improve students' mastery of concepts.
3.	(Egista et al. 2022)	Develop a decent discovery learning model learning device to increase the mastery of learner concepts on harmonic vibration materials.	Learning devices using discovery learning models can increase the mastery of learner concepts.

No.	Author	Research Purposes	Research Result
4.	(Ramadoni et al. 2019)	Develop physics modules using an integrated value-based discovery learning model with a science process approach.	Physics modules using an integrated value-based discovery learning model with a science process approach can improve students' abilities and values.
5.	(Sarah 2021)	Describe the implementation of discovery learning by using personal sites in the physics classroom.	Discovery learning using a personal site improves student interaction and student learning outcomes during online learning.
6.	(Sulistyo & Kartono 2021)	Knowing the influence of the discovery learning model with the active learning teacher-student approach assisted by the WhatsApp application on learning during COVID-19.	The use of the discovery learning model with a teacher-student approach assisted by the WhatsApp application in the era of the COVID-19 pandemic shows a fairly effective relationship and can be an alternative solution.
7.	(Sudarsana et al. 2021)	Knowing the development of website integrated discovery learning-based physics modules is a necessity in physics learning due to the COVID-19 pandemic.	E-modules physics based on integrated discovery learning websites affect physics learning in the era of the COVID-19 pandemic.
8.	(Mahendra et al. 2018)	Develop physics high school student worksheets on temperature and heat materials based on discovery learning models based on metacognitive.	The use of physics LKS in high school students based on the discovery learning model can be said to be valid and can be used for the learning process. The use of LKS based on the discovery model can improve student learning outcomes.
9.	(Praptama et al. 2021)	Knowing the influence of the use of video media with discovery learning models on temperature and heat materials to increase student activity during COVID-19.	Learning using video media with discovery learning models on temperature and heat materials can increase student activity during COVID-19.
10.	(Andriani et al. 2021)	Knowing physics learning during the COVID-19 pandemic at SMA Negeri 1 Kuwus.	Physics teachers use the discovery model with online methods have not been maximized, students become less active.
11.	(Sartono 2019)	Describe the physics learning process by applying the discovery learning model assisted by student worksheets.	With the application of the discovery learning model assisted by LKS, it can improve the learning achievement of student fluid matter physics.
12.	(Kusrini et al. 2018)	Describes the application of the discovery learning model assisted by power point media in class X science 3 students of SMA Negeri 2 Merauke.	Discovery learning models can make students more active and motivated to find solutions to the problems they get.
13.	(Yuszahra et al. 2018)	Knowing the application of discovery learning with e-learning media to learning during the COVID-19 period.	The discovery learning model can improve cognitive abilities and shape students disciplined and positive attitudes during the COVID-19 period.
14.	(Saprudin et al. 2021)	Deciphering the results of studies related to the use of e-books in physics learning.	The use of e-books by applying the discovery learning model can increase students' interest and motivation to learn during online learning.

No.	Author	Research Purposes	Research Result
15.	(Ramadan et al. 2020)	Improving guided discovery-based online physics learning tools for class X students.	Guided discovery-based online physics learning tools are worth using for online learning of momentum and impulse materials during the COVID-19 pandemic.
16.	(Idrus et al. 2021)	Develop a web-based physics e-module using a discovery learning model on newton's law material.	The use of web-based physics e-modules using the discovery learning model on Newton's law can be said to be feasible and valid for learning during the COVID-19 pandemic.
17.	(Maulidiyah et al. 2020)	Improving discovery learning-based e-learning using schoology in physics learning.	The development of e-learning based on the discovery learning model is feasible to be used in physics learning for high school students.
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19.	(Masril et al. 2019)	Knowing the effect of virtual laboratory implementation using the discovery learning model in high school.	With the implementation of virtual laboratories using the discovery learning model can improve the competence of students' skills.
20.	(Kasmiana et al. 2020)	Knowing the influence of guided discovery learning models in understanding student concepts.	The use of guided discovery learning models can improve student learning outcomes and understanding of student concepts.
21.	(Irma et al. 2021)	Analyzing the influence of the Discovery-Based Unity of Science model with sets approach to students' critical thinking skills during the COVID-19 pandemic.	The use of the Discovery-Based Unity of Science learning model with the SETS approach can improve students' critical thinking skills during the COVID-19 pandemic.
22.	(Hikmawati et al. 2021)	Describes the effectiveness of the discovery learning model to train the science process skills of class XI SMA Negeri 1 Kediri students related to elasticity material and Hooke law.	The application of the discovery learning model is effectively used in physics learning and can improve students' science process skills related to elasticity matter and Hooke laws.
23.	(Yoesoef 2022)	Increase activity and meaningful learning of physics from home with a level of inquiry discovery learning.	The application of the level of inquiry discovery learning model can increase student activities and meaningful learning experiences in physics from home during the COVID-19 pandemic.
24.	(Safira et al. 2021)	It was knowing the effect of the implementation of the Guided Discovery Learning Assisted Video and Interactive Simulation (GDM-VIS) model in physics learning.	Implementing the Guided Discovery Learning Assisted Video and Interactive Simulation (GDM-VIS) model can improve students' understanding of concepts.
25.	(Khovivah et al. 2021)	It was knowing the improvement of student learning outcomes on light matter using the discovery learning model.	Learning using the discovery learning model can improve student learning outcomes on light material during a pandemic.
26.	(Awaliyah Rizky & Budi Bhakti 2021)	Develop physics modules using discovery learning models on energy subjects.	The development of physics modules using the discovery learning model on the subject matter of energy is valid and can be used for physics learning.

No.	Author	Research Purposes	Research Result
27.	(Lidiana et al. 2018)	It was knowing the effect of discovery learning using PhET on physics learning outcomes of grade II students of SMAN 1 Kediri for the 2017/2018 Academic Year.	The use of discovery learning models using PhET can improve student physics learning outcomes.
28.	(Septi et al. 2022)	It was knowing the influence of discovery learning models on students' science process skills on physics subjects.	Discovery learning models can improve students' science process skills in physics subjects.
29.	(Salsabila et al. 2019)	It was knowing the effect of implementing the discovery learning model on elasticity material and Hooke's law on physics learning outcomes of high school students.	Implementing the discovery learning model on elasticity material and Hooke's law can improve the physics learning outcomes of high school students.
30.	(Suryanti et al. 2021)	Knowing the influence of the discovery learning model on the mastery of concepts and physics knowledge of high school students.	Discovery learning models can improve high school students' mastery of physics concepts and knowledge.

Model Discovery Learning

Discovery learning is a learning model that usually uses constructivists based on the inquiry theory of learning and occurs in problem-solving situations where learners will learn through already gained knowledge and previous experience to discover facts and relationships related to the new material studied (Simamora et al. 2019). Discovery learning is also a learning that invites students to solve problems to develop knowledge and skills (Yuliana 2018). So, from some of these opinions, it can be concluded that discovery learning is a learning process that is not given as a whole but involves students to organize and develop knowledge and skills that are useful for solving a problem.

According to Maharani (2017) there are several steps of the discovery learning model, namely: (1) Stimulation (stimulus or providing stimulation). Students will be given a problem at the beginning of learning so that students feel confused and curiosity will arise to investigate this matter. And the teacher will be a facilitator by giving a question and directions according to the discovery. (2) Problem statement (statement or problem identification). Here, the teacher allows the learner to identify everything related to the events of the relevant problem. (3) Data collection. From the data collection, evidence related to existing evidence will be obtained so that students can obtain and collect appropriate information. (4) Data processing. Students can process various data and information obtained previously. (5) Verification. Participants prove whether or not a pre-existing statement is true. (6) Generalization (generalization or drawing conclusions). Learners can draw conclusions that will be used as a general principle for all problems. From Maharani, it was found that by using the discovery learning model, it can improve student learning outcomes.

Characteristics of Discovery Learning

Discovery learning is a learning process that is not given as a whole but involves learners organizing and developing knowledge and skills that are useful for solving a problem. There are several characteristics of the discovery learning model, namely: (1) emphasizing more on the learning process, not the teaching process, (2) encouraging students to be more independent, (3) paying attention to the attitudes and beliefs of students in learning, (4) providing opportunities for students to build new knowledge and understanding based on real experiences, (5) encouraging the development of curiosity naturally in students, (6) have the view that learning is a process, not pressing on results.

The purpose of using the discovery learning model in teaching and learning activities is to increase the involvement of students actively in obtaining and processing learning gains, directing students to continue to be learners, not making teachers the only source of information that students need, training students to explore and utilize their environment as a source that will continue to be explored (Fransiska et al. 2018).

Advantages of Discovery Learning in Physics Learning during COVID-19

The advantages of the discovery learning model are that it can help students to improve and improve cognitive skills and processes, can make students develop more according to their respective speeds, can increase the level of appreciation in students because of the results of discussions, is able to make students feel happy because they can carry out research, and can help students in dispelling doubts because it leads to the truth for sure (Yuliana 2018).

During COVID-19, the use of discovery learning models in physics learning in schools can increase students' understanding of student physics subjects (Dewi 2021). Based on previous research conducted by Praptama (2021) the advantage of using the discovery learning model in physics learning during COVID-19 is that it can increase student activity on temperature and heat materials. Based on previous research also conducted by Yuszahra (2018), it is known that the discovery learning model can improve cognitive abilities and can form disciplined and positive attitudes of participants during the COVID-19 pandemic.

During the COVID-19 pandemic, students have carried out remote learning so that teachers are looking for other solutions so that physics learning continues to run well. One of the ways carried out by Sudarsana (2021) is by using physics e-modules based on an integrated discovery learning model website and obtained under the use of physics e-modules based on the discovery learning model can affect physics learning in the era COVID-19 pandemic. Another way is also done by Sulistyo (2021) , namely doing it using the WhatsApp application using a discovery learning model with a teacher-student approach can show a fairly effective relationship and can be an alternative solution in physics learning during the COVID-19 pandemic.

Disadvantages of Discovery Learning in Physics Learning during COVID-19

In addition to having advantages, the discovery learning model also has several disadvantages, especially during the COVID-19 pandemic. The discovery learning model has its drawbacks, which can lead to the assumption that there is a readiness of the mind to learn, the use of this model can consume a lot of time, the application of discovery learning requires a resource-rich learning environment, and students often have difficulty in forming opinions, making predictions, or drawing conclusions, and some teachers are not necessarily able to manage discovery learning properly (Khasinah 2021). According to Yuliana (2018) discovery learning also has a drawback, namely that the discovery learning model is said to be not efficient enough to be used in teaching and learning activities in a large number of students because this model takes a long time to solve a problem.

Previous research conducted by Andriani (2021) explained that the difficulties experienced by students during physics learning during this pandemic are the absence of internet quotas, difficulty understanding materials and teachers'

CONCLUSION

From the results of the study using the literature study method related to the application of the discovery learning model to physics learning during the COVID-19 pandemic in Indonesia, it can be concluded that: 1) The application of the discovery learning model to physics learning during the COVID-19 pandemic can improve student understanding, students' critical thinking ability, and mastery of student concepts. 2) The use of online learning tools and discovery learning-based e-modules can improve students' mastery of concepts in physics learning during the COVID-19 pandemic. 3) The advantages of the discovery learning model in physics learning during the COVID-19 pandemic are that it can improve cognitive abilities and form students' disciplined and positive attitudes. 4) The flexibility of the discovery learning model in physics learning during the COVID-19

pandemic is that students have difficulty understanding the material, and teachers find it difficult to present the material so that the application of the discovery learning model in physics learning during the COVID-19 pandemic in Indonesia is not all effective.

The limitation of this research is that it only uses the discovery learning model in general. The implications for further research can be to develop and refine discovery learning models in the future.

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