AMPLITUDO 1(1) (2022)

AMPLITUDO: Journal of Science & Technology Innovation

https://journals.balaipublikasi.id

Guided Inquiry Learning with Experimental Methods During the Pandemic Period in Improving Physics Learning Outcomes of High School Students

Sofyan Hadi[1*], Nurul Izzati[1], Rizka Nurul Atmi Aulia[1], Solihin Rahmat[1], Trisnawati[1], Yayi Ana Dinda[1]

[1]Department of Physics Education, FKIP, University of Mataram, Mataram, Lombok, West Nusa Tenggara. Indonesia.

DOI:

Article Info
Received: December 20, 2021
Revised: February 25, 2022
Accepted: February 28, 2022

Abstract: This writing aims to provide readers with views on the application of the inquiry learning model with the experimental method during the Covid-19 pandemic. During the pandemic, the government decided to implement online learning which was still less effective in improving student learning outcomes, especially in Physics lessons. Physics lessons are factual lessons, and tend to be calculation activities so that a learning model is needed that allows students to be able to think critically and systematically. This writing uses a literature study by reviewing several articles in national journals. From various journal sources,

Keywords: Pandemic; Physics; Guided Inquiry; Experiment; Online

Citation: Hadi, S., Izzati, N., Aulia, R.N.A., Rahmat, S., Trisnawati, T., & Dinda, Y.A. (2022). Guided Inquiry Learning with Experimental Methods During the Pandemic Period in Improving Physics Learning Outcomes of High School Students. *AMPLITUDO : Journal of Science and Technology Inovation*, *1*(1), 18–25. Retrieved from https://journals.balaipublikasi.id/index.php/amplitudo/article/view/4

Introduction

Hundreds of countries in the world are currently being hit by the Covid-19 (Corona Virus Disease 2019) pandemic, including Indonesia. The spread of the Covid-19 virus is very fast, namely in people aged over 60 years and early childhood, this is due to the reduced immune system in the elderly 60 years and the immune system is still vulnerable in early childhood (WHO, 2020). The Covid-19 pandemic is the latest disease so this is what causes it to become a pandemic (Susilo et al., 2020). The Covid-19 pandemic affects all activities of human life, including in the field of education. Educational activities that are usually carried out face-to-face in class have now been stopped to avoid the spread of the Covid-19 pandemic.

Distance education (PJJ) is education in which students are separated from educators and their learning uses various learning resources through technology and communication and other media (Law Number 20 of 2003 Article 1 Paragraph 15). Distance education (e-learning) is also known as online learning. E-learning is an application created to overcome the limitations between educators and students, especially in terms of space and time, with e-learning educators and students do not have to be in one dimension of space and time and learning can run and ignore both things. Astuti & Febrian, 2019). This online learning method (E-learning) can be used in the four components of education, namely: general education, strengthening educators' knowledge of the subjects taught, teaching pedagogy and child development, and as a guide to better classrooms (Taufik, 2019).

Online learning provides convenience in providing information transfer in various situations and conditions. The various benefits of the ease of online learning are supported by various platforms ranging from discussions to face-to-face virtually (Herliandry, et al. 2020). Various learning media such as audiovisual and other E-learning can be used by teachers or lecturers

*Corresponding Author: fyanfyan1999@gmail.com
Department of Physics Education, FKIP, University of Mataram, Mataram, Lombok, West Nusa Tenggara, Indonesia.

in online teaching and learning activities. Learning media using video is very helpful in the learning process both in formal and non-formal education, generation Z children, namely the generation born in an era that is sophisticated in technology so that the style of learning media used in learning is very general and visual.

According to Massialas (in Matthew and Kenneth, 2013) the guided inquiry model is a teaching model that allows students to move step by step from identifying problems, defining hypotheses, formulating problems, collecting data, verifying results, and generalizing conclusions. The advantage of the guided inquiry model is that the teacher does not let go of the activities carried out by students, so that students who think slowly or students who have low intelligence are still able to follow the activities being carried out and students who have high thinking skills do not monopolize the activities.

Method

The writing in this article is included in the type of writing with data collection techniques based on studies of several journals. The method we use is to review research journals with various methods such as "pretest-posttest control group design", "purposive sampling area", "randomized control group only design", and "nonequivalent control group design". We use the existing theory as explanatory material and end up with a theory. The data analysis technique in this study uses a literature study (literature study). According to Sutrisno (quoted in Kurniawan 2013), states that a library research is because the data needed to complete the research comes from the library in the form of books, encyclopedias, dictionaries, journals, documents, magazines and so on. In this paper, 25 national journals were selected. The literature study that has been obtained is then summarized, analyzed and stated in sub-sections so as to answer the formulation of the writing problem.

Results and Discussion

The results of Endang Lovisia's research (2018) prove that there is a significant effect of the guided inquiry learning model on the physics learning outcomes of class XI students of SMAN 6 Lubuklinggau. Where the average value of the final test of student physics learning outcomes in the guided inquiry class is 76.55 and in the conventional class is 68.67. At first, students still encounter obstacles because they still need time to adjust to the guided inquiry learning model. However, after being applied again for the second time, students began to be interested and enthusiastic in participating in learning.

Besides being proven to attract students' enthusiasm, according to the results of research by Hastuti and Wiyanto (2019), inquiry learning with the experimental method also has a significant effect on students' science process skills in helping to improve learning outcomes. Where Based on calculations with the t test formula, obtained $t_{Count} = 8.56$ and with= 5 % and degrees of freedom = 32 + 35 – 2 = 65 then we get $t_{Table} = 1.66$. It can be seen that $t_{Count} > t_{Table}$ then Ho is rejected and Ha is accepted. Indicates the science process skills taught by the guided inquiry learning model with the experimental method are higher than the verification experimental learning model.

Martanti et al (2021) in their research explain the effect of the guided inquiry learning model with the experimental method during the pandemic using PhET simulation on students' cognitive learning outcomes on Hooke's Law material. Based on the results of the research using the experimental method and the research design posttest only control group design, there are differences in students' cognitive learning outcomes through the inquiry learning model and the experimental method with this PhET virtual simulation tool. Where the average cognitive learning outcomes of experimental class students who were treated with the visual experimental learning method using PhET was 5,278 points higher than the average cognitive learning outcomes of students in the control class who were treated with the lecture learning method.

Haryadi and Umam (2021) also conducted research with the same theme on the material of unidirectional electric circuits. By using the research method used, namely the type of descriptive qualitative research with literature studies from various articles they found, in the first cycle of learning, 85.29% of students succeeded in achieving minimum completion criteria with an average student score of 72.35; and In the second cycle of learning, 89.47% of students managed to reach the minimum completion criteria with an average score of 76.97 students. In addition, there is an increase in individual completeness from 70%-95%. These results prove that PhET simulation has an important role in supporting the learning of direct current circuit material using experimental methods during this pandemic.

Based on the research of Langngan et al, (2021) it was found how effective the use of a virtual laboratory as a learning medium was in helping inquiry learning with this experimental method. By applying the pre-experimental research method with a one group pretest-posttest design, they obtained a comparison of the average increase in pretest results before and after being given treatment through viscous experimental activities through a virtual laboratory. Where previously the average pretest result was 43.75, while after being given treatment through viscosity experiment activities through a virtual laboratory, the pretest result was 84.38.

From the results of this analysis, it can be concluded that there is an increase after the implementation of the virtual laboratory as a learning medium in viscosity experiments.

The results of a journal review written by Nasution (2017), obtained a statement that the use of appropriate learning methods aims to create fun learning and can create optimal learning outcomes. There are several things that need to be considered by the teacher in the selection of learning methods, including the teacher needs to examine the suitability of reciprocity with the objectives of the learning method. The method used must also be in accordance with the learning objectives, conditions, types and functions. The learning method used must also be in accordance with the time, place and ability of students to receive the material presented. The use of learning methods not only helps improve student learning outcomes, but can also help develop teacher creativity in delivering learning materials.

Based on the observations of Hidayah, et al (2017) in the journal it was said that there was an increase in students' science process skills related to the use of experimental methods during the learning process to measure students' skill levels. From the results of observations made, it can be seen that the use of experimental methods can improve students' science process skills. The stages carried out in the experimental method are: stage 1 introduction by providing motivation to encourage students' enthusiasm in following the lesson. Phase 2 is the core activity, where the teacher guides students during the learning process, starting from explaining the experiment to be carried out, guiding students in the process of identification, experimentation, concluding to communicating the results of the experiment.

Zakiyah, et al (2019) said, based on the results of their observations, it is suspected that to improve student learning outcomes, a learning method that involves students directly in solving a problem by experimenting makes learning more fun. The use of this media is thought to be more effective than using the monotonous method by only receiving an explanation from the teacher, taking notes, then working on the practice questions given by the teacher. Based on the above problems, Zakiyah, et al (2019) said that in order for learning to achieve results in accordance with the planned objectives, teachers need to apply varied learning methods in the classroom in order to provide something different in learning, so that student learning outcomes are expected to be better than before. Based on the data from observations made by Zakiyah, et al (2019), it can be concluded that the results of the pre-test before the experimental method was applied were not complete, there were significant changes in the learning outcomes after being given learning using the experimental method.

Based on the research of Amijaya et al (2018) with a quasi-experimental research method with a nonequivalent control group design, it turns out that learning outcomes using the guided inquiry model have better improvements compared to classes using conventional models. Where, in this guided inquiry model, students are given the opportunity to be directly involved in learning activities so that students are motivated to learn and the learning process is memorable. And also, the active involvement of students in learning will improve their learning outcomes and can encourage students to actively explore their own knowledge so that students can become independent, active, and independent individuals.

The results of the research by Hosnah et al. (2017) data on learning activities was obtained from the quantitation method from the observational interval data during learning activities carried out in the experimental class and control class. The quantified data obtained an average value for the experimental class of 87.34, while the average for the control class was 57.59. The data shows that the average score of the experimental class students' physics learning activities is better than the control class students' average physics learning activity scores.

Data from observations made by Saregar, et al (2013) with a quasi-experimental method showed that the average cognitive and affective achievement of students in the class that used the experimental method were 80.9 and 77.06, respectively, while the class that used the discussion demonstration method respectively -are 72.3 and 71.06, respectively. This shows that the use of the experimental method is better than the use of the discussion demonstration method in learning Physics. The use of contextual learning using interactive multimedia with experimental methods is better able to stimulate students to learn actively in developing students' own knowledge and students can also relate the knowledge they have acquired in everyday life (Saregar et al, 2013).

Based on the results of research by Wahyuni, et al (2016) from research using quasi-experimental research methods where in quasi-experimental research the researcher does not have the flexibility to manipulate the subject, that in this study, the learning outcomes measured were students' cognitive abilities on elasticity and Hooke's law. It can be seen that student learning outcomes at the time of the initial test and the final test of students are different. The increase in final test results occurred in the control class and experimental class, but the increase was greater in the experimental class which used the guided inquiry learning model with the experimental method. The results of the analysis of hypothesis testing at a significance level of 5% obtained $t_{count} = 6.27$, greater than $t_{table} = 1.993$.

The results of research by Doyan, et al (2018) Inquiry learning also emphasizes the maximum activity of students who are directed to seek and find their own answers to something in question. Another study was also conducted by Yulian (2015) which showed that the use of guided inquiry learning models with experimental methods could increase students' activities and learning outcomes of physics. The use of the guided inquiry learning model requires accuracy in the learning process because a lack of accuracy can give results that are less than optimal and require a longer time because students must experiment carefully and not in a hurry to get really maximum results.

Based on the research results of Subekti and Ariswan (2016) in this study using a quasi-experimental research model. The study was conducted in two classes, namely the experimental class and the control class where the comparison of the average pretest value for the experimental class and the control class was the same, namely 50%. However, the average posttest score produced by the experimental class was higher than the control class, as shown in Figure 2. The percentage of the posttest mean score for the experimental class was 56.7% while for the control class it was 43.3%. In general, students experienced an increase in mastery of concepts after participating in learning. The increase in mastery of this concept can be seen from the normalized value of gain (N-gain) obtained. (N-gain) is an increase in student learning outcomes obtained by the ideal score of the posttest score minus the pretest score divided by the maximum score minus the pretest score. The level of normalized gain gain from both classes is categorized in the medium category. From the table, it can be seen that the Ngain value for the experimental class is 0.68 and for the control class is 0.45. So it can be concluded that the increase in mastery of concepts for the experimental class is greater than the increase in mastery of concepts in the control class.

The results of Sari, et al (2015) research using a research design Pretest-Postest Control Group Design Observation science process skills have the lowest percentage, namely the pretest percentage is 0.43 and the posttest is 0.86. The increase in value only reached 0.43 after being given a guided inquiry learning model. An increase in the observation aspect shows that students have been able to use as many of their senses as possible to make an observation and are also able to use relevant and adequate facts from the observations. suitable for finding solutions to problems faced, both discussing and seeking information through library research.

Based on the research results of Dewi, et al (2013) who used experimental research methods. Experimental research is research that is intended to determine whether there is a result of "something" imposed on the subject under investigation. Based on descriptive data analysis, it was found that the scientific attitude and science learning outcomes of students who were taught using the guided inquiry learning model and the conventional learning model showed that the average scientific attitude score of students who followed the guided inquiry learning model was 248.09 in the very high category. The average score is greater than the average scientific attitude score of students who follow the conventional learning model, which is 229.56 in the high category. While the average score of science learning outcomes of students who follow the guided inquiry learning model is 78.12 which is in the high category, which is greater than the average score of science learning outcomes of students who follow the model. Science students who follow the conventional learning model. The results of the study are not only guided by the average score of scientific attitudes and learning outcomes but are also described by a description of the mastery of each indicator.

The results of research from Wahyuni et al., (2018) show that learning physics is considered a difficult subject because it is related to formulas and abstract concepts. Students' interest in learning physics arises when the material being studied is directly related to its application. The implementation of learning is still dominated by the teacher (teacher center) by explaining the material in detail and then providing practice questions. Students need learning innovations through experiments, where physics material is not only memorized but can be practiced in real life. Based on this, a guided inquiry-assisted physics learning device was developed.

Based on the results of research by Simbolon and Sahyar (2015) in the cognitive domain, it was concluded that the C1 category of Guided Inquiry (experimental class) had a higher average gain value of 0.09 compared to DI (control class). For category C2 Inquiry (experimental class) has an average gain value of 0.26 higher than DI (control class). For category C3 Inquiry (experimental class) has an average gain value of 0.20 higher than DI (control class). For the C4 Inquiry category (experimental class) the average gain value is 0.29 higher than DI (control class). For category C5 Inquiry (experimental class) has a higher average gain of 0.42 compared to DI (control class).

Based on the research results of Muliana, et al (2018), it was found that there was a significant difference between the physics learning outcomes of students who were taught using the guided inquiry learning method and those taught using conventional learning to students. Using the guided inquiry learning method more involved students to be active. and work together in discussions and do practicum. This certainly can stimulate thinking skills and motivate students. Cognitive learning outcomes of students who receive learning using guided inquiry learning methods are higher than students who receive lessons using

conventional learning. The same thing was expressed by Yulian (2015) that the use of guided inquiry learning methods with experimental methods can improve students' physics learning outcomes. This is due to the use of the student worksheet which is in accordance with the inquiry steps in the experimental class. The existence of this inquiry step makes it easier for students to understand the existing problems so that they can improve student learning outcomes.

In Magvira, et al's research (2016) Based on the results of descriptive analysis, the average score of students before the application of the inquiry learning model to student learning outcomes on heat material was 42.78 and for the average value of students after the application of the inquiry learning model to the results students' learning on heat material is 66.70 and for the experimental class it is 75.40. Based on this data, it can be concluded that there is an effect of student learning outcomes on heat material. While the results of the inferential analysis using the T-test obtained the value of Tcount of 20.20 and Ttable of 1.684. The test results obtained show that the results of Tcount < T table or 20.20 < 1.684.

Erlinda (2016) learning outcomes for students' cognitive and affective domains, it can be seen that the application of inquiry learning methods can improve students' physics learning outcomes. This means that students' learning outcomes in the cognitive and affective domains during the learning process provided by the application of the inquiry learning method with handouts are better than students using conventional learning, meaning that they are in the rejection of H0 and acceptance of Hi so that it can be concluded that "There is an effect of applying the method inquiry learning accompanied by handouts on the physics learning outcomes of class X MIA students of SMAN 1 Batang Anai".

Ni'mah and Dwijananti, (2014) said that the application of the Think Pair Share (TPS) learning model with the experimental method made students more enthusiastic in participating in physics learning, students could observe directly how the process of light reflection on concave mirrors and convex mirrors occurs, so that students become more active in conducting experiments. The application of TPS encourages students to think individually and consider the answer ideas carefully with their partners or groups, so that not only one student understands the subject matter, so students are more active in asking questions in the learning process. Aspects of doing tests in the experimental class and control class were assessed from the number of pre-test and post-test questions that students did. Aspects of doing tests in the experimental class and the control class are not much different.

In the research of Nurfarida, et al (2019) the learning model applied is the guided inquiry model. The guided inquiry model is a learning model that aims to involve students actively in carrying out teaching and learning activities, where in practice the teacher provides broad guidance for students. By applying this guided inquiry learning model, students are given the freedom to develop the concepts they learn and students are given the opportunity to solve the problems they face in groups and provide a kind of cover when students have been able to solve the problems given by the teacher. In the process of teaching and learning activities students are the subject of learning and not the object of learning, therefore students who play an active role in learning more than teachers, the teacher is only a facilitator who guides students in the learning process so that students can improve learning outcomes. Based on the description above, the guided inquiry learning model is a model that involves students actively in the learning process so that students can improve their learning outcomes without having to always depend on the teacher to gain knowledge. This is in accordance with the objectives that the researchers adopted, namely the Influence of Guided Inquiry Learning Models on Students' Physics Learning Outcomes on Momentum and Impulse Materials for Class X SMA Negeri 8 Mataram. Based on the description above, the guided inquiry learning model is a model that involves students actively in the learning process so that students can improve their learning outcomes without having to always depend on the teacher to gain knowledge. This is in accordance with the objectives that the researchers adopted, namely the Influence of Guided Inquiry Learning Models on Students' Physics Learning Outcomes on Momentum and Impulse Materials for Class X SMA Negeri 8 Mataram. Based on the description above, the guided inquiry learning model is a model that involves students actively in the learning process so that students can improve their learning outcomes without having to always depend on the teacher to gain knowledge. This is in accordance with the objectives that the researchers adopted, namely the Influence of Guided Inquiry Learning Models on Students' Physics Learning Outcomes on Momentum and Impulse Materials for Class X SMA Negeri 8 Mataram.

Based on the results of Hizbi's (2015) research using histograms, data normality tests, data homogeneity tests and analysis of variance, he obtained the results of the hypotheses. The first hypothesis, there is an effect of the use of experimental methods and guided inquiry on students' analytical skills. Experimental learning methods and guided inquiry are not much different. The second hypothesis, there is no influence of scientific attitude on students' analytical skills. Scientific attitude is an attitude that must exist in a scientist or academician when facing scientific problems, including; attitude of responsibility, honesty, curiosity, thoroughness,

expressing opinions, and others. 3rd hypothesis. There is an interaction effect between learning methods and scientific attitudes on students' analytical skills.

The results of the research by Indra, et al. (2012) showed that the experimental class had a higher average psychomotor activity value than the control class. In learning using the Group Investigation model based on guided inquiry experiments, students actively work together in groups to conduct investigations in the form of experimental activities in an effort to find the concept of light reflection. Students conduct investigations in groups with different sub-topics. Each group has the task of discussing and solving the problems discussed which then the results of solving these problems will be presented in front of the class. The use of the Group Investigation learning model is proven to further increase student activity. This is in accordance with the research of Nasrudin and Utiya (2010), that the application of the Group Investigation model can increase student activity in learning science. This is different from the control group which was given a simple experimental method of learning. With this method students are first given the material, then through experimental activities students are only tasked with proving the material that has been delivered by the teacher. This can limit the activity and thinking ability of students. In addition, the student worksheets used in learning with the simple experimental method is more like a recipe book, where students are given detailed instructions for activities that can limit students' intellectual abilities. With this method students are first given the material, then through experimental activities students are only tasked with proving the material that has been delivered by the teacher. This can limit the activity and thinking ability of students. In addition, the student worksheets used in learning with the simple experimental method is more like a recipe book, where students are given detailed instructions for activities that can limit students' intellectual abilities. With this method students are first given the material, then through experimental activities students are only tasked with proving the material that has been delivered by the teacher. This can limit the activity and thinking ability of students. In addition, the student worksheets used in learning with the simple experimental method is more like a recipe book, where students are given detailed instructions for activities that can limit students' intellectual abilities.

Conclusion

Based on the results of the analysis of the data obtained, it is concluded that the guided inquiry learning model with the experimental method has a significant effect on the physics learning outcomes of high school students during the pandemic. This learning model is an inquiry-based learning model where students must find answers to the problems presented through the process of observation or experimentation. Giving a problem from the lecturer or teacher and how to solve the problem. Through the problems presented, students must make observations about the problems presented, find predictions for the problems presented and draw conclusions from the observations and predictions that have been obtained. Then do the practice questions, quizzes and exams. After that, have a discussion in order to help students learn communication skills. This strengthens students' understanding and thinking patterns during online learning.

References

Amijaya, L. S., Ramdani, A., & Merta, I. W. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Hasil Belajar Dan Kemampuan Berpikir Kritis Peserta Didik. *Jurnal Pijar Mipa*, *13*(2), 94–99. https://doi.org/10.29303/jpm.v13i2.468

Astuti, P., dan Febrian, F. (2019). Blended learning: Studi efektivitas pengembangan konten e-learning di perguruan tinggi. *Jurnal Tatsqif*, 17(1), 104- 119. https://doi.org/10.20414/jtq.v17i1.972

Dewi, N.L., Dates, N., & Sadia, I.W. (2013). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Sikap Ilmiah dan Hasil Belajar IPA. e-Journal Program Pascasarjana. 3(2). 5-6.

Erlinda, N. (2016). *Penerapan Metode Pembelajaran Inkuiri Disertai Handout: Dampak Terhadap Hasil Belajar Fisika Siswa SMA 1 Batang Anai Padang Pariaman*. Lampung. Universitas Islam Negeri Raden Intan Lampung.

Haryadi, R., & Umam, A.K. (2021). Pemanfaatan Simulasi Phet Dalam Mendukung Pembelajaran Fisika Materi Rangkaian Listrik Searah Pada Masa Pandemi. *Jurnal Pendidikan Fisika*. 6(1). Retrieved from https://online-journal.unja.ac.id/EDP/article/view/11446

Hastuti, D.A.W., & Wiyanto, W. (2019). Pengaruh Model Pembelajaran Guided Inquiry dengan Metode Eksperimen Terhadap Keterampilan Proses Siswa. *Unnes Physics Education Journal*. 8(3). 288-298. https://doi.org/10.15294/upej.v8i3.35630

Herliandry, L. D., Nurhasanah, N., Suban , M. E., & Kuswanto, H. (2020). Pembelajaran Pada Masa Pandemi Covid-19 . *JTP - Jurnal Teknologi Pendidikan*, *22*(1), 65-70. https://doi.org/10.21009/jtp.v22i1.15286

Hidayah, N., Arifuddin, M., Mahardika, A.I. (2017). Meningkatkan Keterampilan Proses Sains Pada Pembelajaran Fisika Menggunakan Metode Percobaan. *Berkala Ilmiah Pendidikan Fisika*. 5(2), 198-212. http://dx.doi.org/10.20527/bipf.v5i2.2914

Hizbi, T. (2015). Pengaruh Metode Eksperimen Inkuiri Terbimbing dan Sikap Ilmiah Terhadap Kemampuan Analisis Siswa. *Jurnal EducatiO*. 10(2). 298-315. https://doi.org/10.29408/edc.v10i2.161

Hosnah, W., subiki, s., & sudarti, S. (2017). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Hasil Belajar Fisika Di SMA. *Jurnal Pembelajaran Fisika,* 6(2), 196-200. https://doi.org/10.19184/jpf.v6i2.5020

Langngan, V.B., Tulandi, D.A., & Mandang, T. (2021). Efektivitas Laboratorium Virtual Sebagai Media Pembelajaran Pada Eksperimen Viskositas. *Jurnal Pendidikan Fisika Charm Sains*. 2(2): 88-93. https://doi.org/10.53682/charmsains.v2i2.112

Lovisia, E. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing terhadap Hasil Belajar. *SPEJ (Science and Physic Education Journal)*, 2(1), 1-10. https://doi.org/https://doi.org/10.31539/spej.v2i1.333

Magvira, S. (2016). *Pengaruh Model Pembelajaran Inqury terhadap Hasil Belajar Fisika Siswa Kelas VII SMP Negeri 32 Makassar*. Undergraduate (S1) thesis, Universitas Islam Negeri Alauddin Makassar

Martanti, N., Malika, E.R., & Setyaningsih, A. (2021). Pengaruh Metode Pembelajaran Eksperimen Virtual Menggunakan PhET Terhadap Hasil Belajar Kognitif Siswa. *Konvergensi Teknologi dan Sistem Informasi*. 1(1). 83-92. https://doi.org/10.24002/konstelasi.v1i1.4315

Muliana, M. (2018). Pengaruh Metode Pembelajaran Inkuiri Terbimbing Terhadap Hasil Belajar Fisika Peserta Didik Sma Negeri 3 Polewali. Jurnal Sains dan Pendidikan Fisika. 4(2). https://doi.org/10.35580/jspf.v14i2.10807

Nasution, M. (2018). Penggunaan Metode Pembelajaran Dalam Peningkatan Hasil Belajar Siswa. *Studia Didaktika, 11*(01), 9 - 16. Retrieved from http://jurnal.uinbanten.ac.id/index.php/studiadidaktika/article/view/515

Ni'mah., A., & Dwijananti, P. (2014). Penerapan model pembelajaran think pair share (TPS) dengan metode eksperimen untuk meningkatkan hasil belajar dan aktivitas belajar siswa kelas VIII MTS. Nahdlatul muslimin Kudus. *UPEJ: Unnes Physics Edua=cation Journal.* 3(2). https://doi.org/10.15294/upej.v3i2.3593

Nurfarida, Bahtiar, B., & Ernita, N. (2019). *Pengaruh Model Pembelajaran Inkuiri Terbimbing Pada Pembelajaran Fisika Untuk Meningkatkan Hasil Belajar Siswa*. Jurnal Riset Inovasi Pembelajaran Fisika. 2(2). https://doi.org/10.29103/relativitas.v2i2.1790

Nurmayani, L., Doyan, A., & verawati, N. N. S. P. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Hasil Belajar Fisika Peserta Didik. *Jurnal Penelitian Pendidikan IPA*, 4(2). https://doi.org/10.29303/jppipa.v4i2.113

Saregar, A., Sunarno, W., & Cari, C. (2013). Pembelajaran Fisika Kontekstual Melalui Metode Eksperimen Dan Demonstrasi Diskusi Menggunakan Multimedia Interaktif Ditinjau Dari Sikap Ilmiah Dan Kemampuan Verbal Siswa. *INKUIRI: Jurnal Pendidikan IPA,* 2(02). http://dx.doi.org/10.20961/inkuiri.v2i02.9754

Sari, K., Syukri, M., & Halim, A. (2015). Pengaruh Penerapan Metode Eksperimen dan Inkuiri Terbimbing Terhadap Keterampilan Proses Sains dan Sikap Ilmiah Siswa. *Jurnal Pendidikan Sains Indonesia.* 3(2). 53-54. Retrieved from http://www.journal.unsyiah.ac.id/JPSI/article/view/7680

Simbolon, D.H., & Sahyar. (2015). Pengaruh Model Pembelajaran Inkuiri Terbimbing Berbasis Eksperimen Riil dan Laboratorium Virtual terhadap Hasil Belajar Fisika Siswa. *Jurnal Pendidikan Dan Kebudayaan*, *21*(3), 299-316. https://doi.org/10.24832/jpnk.v21i3.192

Subekti, Y., & Ariswan, A. (2016). Pembelajaran fisika dengan metode eksperimen untuk meningkatkan hasil belajar kognitif dan keterampilan proses sains. *Jurnal Inovasi Pendidikan IPA, 2*(2), 252-261. https://doi.org/10.21831/jipi.v2i2.6278

Susilo, A., Rumende, C.M., Pitoyo, C.W., Santoso, M.D., Yulianti, M., Herikurniawan, H., Sinto, R., Singh, G., Nainggolan, L., Nelwan, E.J., Chen, L.K., Widhani, A., Wijaya, E., Wicaksana, B, Maksum, M., Annisa, F., Jasirwan, C.O.M., & Yunihastuti, E. (2020). Coronavirus Disease 2019: Tinjauan Literatur Terkini. *Jurnal penyakit dalam Indonesia*. 7(1). http://dx.doi.org/10.7454/jpdi.v7i1.415.

Taufik, R. (2019). *Pemblajaran Daring Era Covid-19*. Retrieved from https://www.google.com/url?sa=t&source=web&rct=j&url

Wahyuni, R., Hikmawati, H., & Taufik, M. (2017). Pengaruh Model Pembelajaran Inkuiri Terbimbing dengan Metode Eksperimen terhadap Hasil Belajar Fisika Siswa Kelas XI IPA SMAN 2 Mataram Tahun Pelajaran 2016/2017. *Jurnal Pendidikan Fisika Dan Teknologi*, *2*(4), 164–169. https://doi.org/10.29303/jpft.v2i4.308

Wahyuni, S., Kosim, K., & Gunawan, G. (2018). Pengembangan Perangkat Pembelajaran Fisika Berbasis Inkuiri Terbimbing Berbantuan Eksperimen Untuk Meningkatkan Penguasaan Konsep Siswa. *Jurnal Pendidikan Fisika Dan Teknologi*, *4*(2), 240–246. https://doi.org/10.29303/jpft.v4i2.891

Wahyuningsih, I., Sarwi., & Sugianto. (2012). Penerapan Model Kooperatifgroup Investigation Berbasis Eksperimen Inkuiri Terbimbing untuk

Meningkatkan Aktivitas Belajar. *Unnes Physics Education Journal*. 1(1). https://doi.org/10.15294/upej.v1i1.774

Zakiyah, Z., Amin, A., & Lovisia, E. (2019). Penerapan Metode Eksperimen Pada Pembelajaran Fisika Siswa Kelas X SMAN 3 Lubuklinggau Tahun Pelajaran 2018/2019. *Silampari Jurnal Pendidikan Ilmu Fisika.* 1(2), 130-138. https://doi.org/10.31540/sjpif.v1i2.792