



Identification of Student Independence and Physics Learning Achievements During COVID-19 Pandemic

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Abstract: This study aims to identify student independence and physics learning achievement during the COVID-19 pandemic. The descriptive qualitative method was used in this study. The research participants are 100 10th-grade students in Vocational High School in Bantul, Yogyakarta. Data collection techniques were carried out using questionnaires and cognitive tests. The results showed that students' independence from others is 55%, self-confidence 60%, self-discipline 48%, sense of responsibility 71%, behavior based on self-initiative 58%, and self-control 63%. Besides, physics learning achievements that have not completed the minimum completeness criteria are complete 63% of those who have reached the minimum completeness criteria are complete 37%. It can be concluded that the independence of students and the results of physics learning achievements during the COVID-19 pandemic is in the medium category.

Keywords: Distance Learning; Learning Achievement; Student Independence; Vocational High School

Introduction

The COVID-19 pandemic has transformed education systems in the world. It also led to the closure of schools and universities and the recommendation of distance learning. The existence of this pandemic has made distance learning models grow and develop to be used in various levels of education (Feranie et al., 2023). Distance learning requires mature readiness. It is necessary to prepare a strategy both in the form of regulations that stipulate all the rules and achievements that are included in the form of curriculum and guidance in the process of implementing distance learning activities so that they can be carried out widely at all levels and in various regions (Kaufman et al., 2020; Taufik et al., 2020).

Online learning must promote effective interaction and communication patterns between teachers, students, and parents. Therefore, online learning must be properly designed to provide quality, innovative, massive, and open learning services (Bilfaqih &

Qomarudin, 2015; Kuntarto, 2017). It will require educators to be able to provide the best service. The role of education is very important, not only limited to mastering the material but also to the role and responsibility of students in creating meaningful learning. This meaningful learning ultimately raises students' demand and motivation to learn in a fun way. Distance learning during the COVID-19 pandemic is actually a force that can catalyze changing education in Indonesia. This COVID-19 will ultimately establish independent learning for students in Indonesia.

Independent learning is an approach that seeks to empower students to be more responsible for their learning (Rahmat et al., 2023). The independent learning will ultimately develop students' academic and personal abilities (Bart et al., 2020; Dietrich et al., 2020). Through independence, students will develop self-awareness and self-confidence as a learner. Thoha in Sundayana stated that there were eight characteristics of independent learning, namely: (1) being able to think critically, creatively, and innovatively; (2) it is difficult to be

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influenced by the opinions of others; (3) never running away or avoiding trouble; (4) think deeply for solving the problem; (5) if they find a problem, solve it themselves without asking for help from others; (6) do not feel inferior if they have to be different from other people; (7) try to work with full diligence and discipline; and (8) are responsible for their actions (Sundayana, 2018).

The problem of implementing distance learning is not only our problem in Indonesia but has become a common issue in various countries. The implementation of this distance learning implementation raises many obstacles. Location teachers and students who are separated when carrying out learning make the teacher unable to directly monitor student activity during the learning process. Online learning should be carried out in the not too distant future because students have difficulty maintaining concentration when learning online held for more than an hour (Salman, 2012). Apart from technical constraints, motivation constraints become a problem (Weidlich & Bastiaens, 2018). Based on this online learning research, 44% of students felt that their abilities had decreased significantly, high conceptual misunderstanding, increased fatigue, and motivation to learn and attend lectures decreased drastically (Chen et al., 2020).

One of the factors that can affect learning achievements is students' independence in learning. The learning achievements to be achieved are following their potential, interests, talents, and abilities, and according to the type of intelligence to achieve national education goals. The purpose of learning physics is a process of interaction between teachers and students to achieve educational goals. A problem indicates success or failure. The main problem in education in Indonesia is the low learning achievements of students in schools.

Meanwhile, student learning achievements in physics lessons at one of the Vocational High Schools in Bantul, Yogyakarta, found that they mostly get low results. Student learning achievements in physics lessons before the remedial were carried out most of the students had not yet reached completeness. This study aimed to identify student independence and physics learning achievements during the COVID-19 pandemic in Vocational High Schools.

Identifying student independence and physics learning outcomes during the COVID-19 pandemic in vocational schools is an important research carried out for various logical reasons. Physical distancing and school closures during the pandemic have had a significant impact on the learning process. Identifying student independence can help understand the extent to which students can overcome these obstacles and stay focused on learning physics. Student independence is an important skill that needs to be developed to face future

challenges. Identifying students' level of independence in learning physics can help schools develop learning strategies that support the development of student independence.

In addition, the COVID-19 pandemic has forced many educational institutions to switch to online learning. This research can help identify the extent to which students are able to access and utilize online resources to improve their understanding of physics material. The results of the study can help schools and teachers to adapt physics learning methods to the needs of students during the pandemic. There may be a need for more interactive learning strategies or an emphasis on the self-reliance aspect of learning. The pandemic can have a psychological impact on students, such as anxiety or loss of motivation. This research can assist in understanding the impact of this on student independence and assist schools in providing the necessary psychological support. The results of the study can be the basis for formulating better education policies in the face of similar situations in the future. Governments and educational institutions can use these findings to improve preparedness for similar crises. So, by conducting this research, we can optimize students' learning experience during the pandemic and ensure that they still have good physics learning skills despite being faced with unexpected challenges.

Method

The research was conducted using a qualitative descriptive method. This research comprises four stages, as illustrated in Figure 1. The data collection technique in this study used a learning independence questionnaire developed by Hidayati and Listyani, the results of the Final Semester Assessment test (Hidayati & Listyani, 2010). The learning independence questionnaire consists of 20 items which fall into six indicators. Assessment for each questionnaire statement with a Likert scale of 4: Strongly Agree (SS), 3: Agree (S), 2: Disagree (TS), and 1: Strongly Disagree (STS).

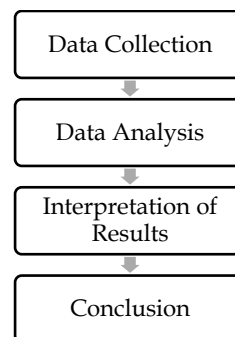


Figure 1. Design of Research

Table 1. Indicator of Learning Independence Instrument

Indicator	Number of Items
Dependence on others.	4
Have self-confidence.	3
Be disciplined.	3
Have a sense of responsibility.	3
Behave on your initiative.	4
Exercise self-control.	3
Number of grains	20

The sampling technique in this study was the purposive sampling technique. The sample of this research was 100 10th-grade students in Vocational High School in Bantul, Yogyakarta. Data were analyzed with equations (1) (Himawan et al., 2020). To determine of percentage quality is shown in Table 2.

$$P = \frac{f}{N} \times 100\% \tag{1}$$

Description

P : Percentage of students for each indicator

f : Student frequency for each indicator

N : Number of samples

Table 2. Quality categories of percentage

Percentage (%)	Information
66.68 - 100	High / Good
33.34 - 66.67	Moderate / Enough
0.00 - 33.33	Low / Less

Result and Discussion

The COVID-19 outbreak has forced learning activities to be conducted remotely (online). The existence of Covid-19 forces students and students to study remotely using technology. It brings changes to the form of the learning process that is not face-to-face directly. However, there is a positive side to online learning, which is to foster independent learning (Firman & Rahayu, 2020). Learning without direct guidance from educators makes students independently seek information about the material and assignments given to them. Through online learning, students can freely set their learning strategies. Research conducted by Firman and Rahman shows students can arrange a place where they want to take part in learning (Firman & Rahayu, 2020).

Online learning can be an effective tool for identifying factors that influence student learning outcomes in an online learning environment. Teachers can assess how well their online learning strategies are working. This involves evaluating the way the material is delivered, the use of online learning tools, and the response to student needs. Online learning platforms

typically store data about student activity, including time spent in each module, test scores, and participation in discussion forums (Alzahrani, 2022). Analysis of this data can provide insight into students' levels of understanding and engagement.

The independence of student learning consists of six aspects, namely: (1) Independence of others, (2) Having self-confidence, (3) Be disciplined, (4) Have a sense of responsibility, (5) Be based on own initiative, and (6) Exercise self-control (Hidayati & Listyani, 2010). Then based on these six aspects, it is translated into 20 questions. Based on the data obtained from data collection in the form of a questionnaire, it shows the results of student independence in distance learning at one of the Vocational High Schools in Bantul, Yogyakarta, as shown in Figure 2.

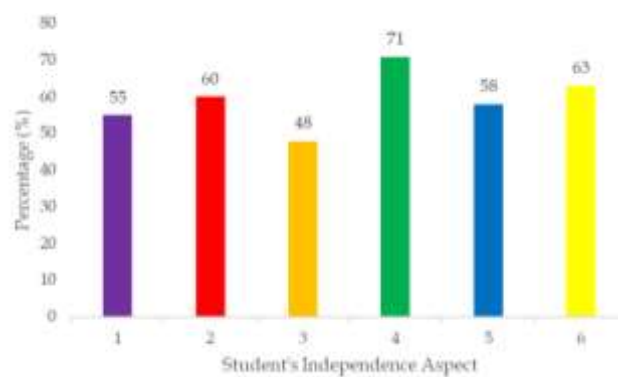


Figure 2. Results of the Student's Independence

The graph distribution in Figure 2 shows that the average level of students' independence in distance learning tends to be moderate, namely 59%. When viewed for each indicator, it can be seen that indicator 1, namely the independence of others, shows 55% results in the moderate category. These results indicate that students are still dependent on others in learning physics. For the second indicator: the respondents' results are in a moderate position, namely 60%, which means they are confident enough to learn physics online. The third indicator, disciplined behavior, is the lowest result of all indicators. Based on the questions in the questionnaire, students did not try to be present on time when learning physics online and did not immediately collect physics assignments given by the teacher on time. So that students' discipline needs to be improved. A sense of responsibility is the highest indicator, with 71%. It can be interpreted that students can stimulate themselves to continue to be enthusiastic about learning physics and focus their attention on distance learning activities in Physics. Meanwhile, the indicators of behavior based on one's initiative and self-control are in the moderate/sufficient category, with results showing 58% and 63%, respectively.

To develop student learning independence, the teacher should create a conducive learning atmosphere and avoid anything that will interfere with student learning, encourage students to understand the correct methods and procedures in completing a task, help students manage time, and foster self-confidence in their students' ability to do assignments. Encourages students to control emotions and not easily panic when completing assignments or facing difficulties, and maintains students' progress.

The COVID-19 pandemic has had a huge impact on daily life, including on students at various levels of education. The stress students experience can come from a variety of sources, such as health uncertainty, distance learning, social isolation, and economic issues that their families may experience (Wąsowicz et al., 2021). In the context of learning, excessive stress can hinder students' ability to focus, learn, and achieve optimal results. Therefore, it is important for educators and counselors to understand the stress factors that students may experience and provide the necessary support and resources. In addition, creating a learning environment that supports students' psychological well-being, provides space to talk about stress, and provides healthy coping strategies can help reduce the negative impact of stress on learning outcomes.

Based on the data obtained from the final examination of Physics in Vocational School students in Bantul, Yogyakarta, in semester 1 of 2020/2021 is shown in Figure 3.

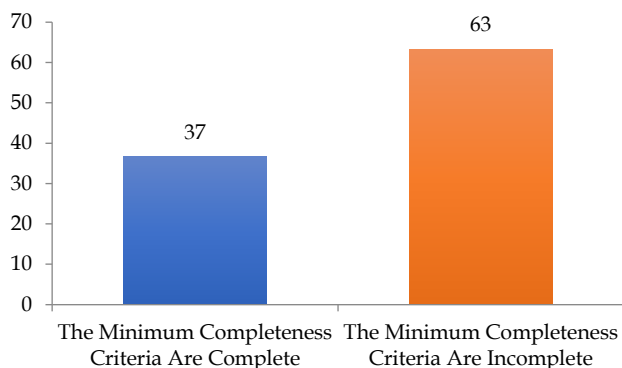


Figure 3. Percentage of Final Examination Score

Figure 3 shows that the analysis of the percentage of learning achievements shows that 63% of research respondents in class X Bantul Health Vocational High School are still below minimum completeness criteria and complete 75. At the same time, 37% have reached or above the minimum completeness criteria and are complete 75. The low student learning achievements in Physics subjects are due to their lack of independence in studying at home. It can be interpreted that there are still many students who learn because of the encouragement

of others. Students rarely work on the questions in the book except on orders from the teacher. So that students do not have the high and maximum motivation to obtain the results.

Motivational theories such as self-determination theory and expectancy-value theory can provide insight into the factors that motivate students to learn, especially in the context of distance learning (Vu et al., 2022). Self-Determination theory emphasizes three basic needs that motivate human behavior, namely the need for autonomy, competence, and social relationships. Expectancy-Value focuses on students' beliefs about their ability to succeed (expectations) and the value they place on specific tasks or subjects (grades).

In addition, the core problem of the lack of minimum completeness criteria are complete achievement is that there are still a few students who ask questions when the lesson is going to, is in, or after it is taking place. When students are given topics to carry out discussions, many still passively ask or answer questions. Students do not plan their own learning activities, they do not have the confidence that they can overcome the problems or obstacles they face during distance learning physics activities, and they do not evaluate learning achievements to be a factor in the low learning independence of students during distance learning.

Parents also have a significant role in the attitude and independence of student learning. Parents' encouragement, motivation, and enthusiasm are very influential in increasing students' learning independence. Assistance when studying certainly increases students' enthusiasm for learning, so their performance is hoped to improve. Parental concern with full of affection for their children's education, will foster children's activities as a very valuable potential to face the future (Suhendri & Mardalena, 2015). So that in education in the family environment is very supportive achievement student learning In addition to the influence of parents, the teacher also influences the development of students' independent attitudes in carrying out the learning process. If the learning process is still teacher-centered, it causes students to be passive, tends to be silent, and rely heavily on the teacher's explanation. The challenge of teachers in the distance learning process is greater because they cannot directly monitor student activities during learning. Teacher creativity in developing learning tools must be student-centered. Thus students can stimulate and train independence in learning during distance learning. Learning independence is very important, especially in learning physics. Learning physics is not only by memorizing it but must be understood so students can solve theory-related problems. Resilience theory can be used to understand how students can cope with

challenges and adapt positively to change, such as learning during a pandemic.

Resilience theory can provide valuable insights in understanding how students can overcome challenges and adapt positively to change, including learning situations during a pandemic. Resilience refers to a person's ability to recover or adapt well after experiencing stress, pressure, or challenges (Rojas-Suárez et al., 2020). In an educational context, student resilience can play an important role in helping them deal with sudden changes such as distance learning, social distancing, or changes in teaching methods. Here are some key concepts in applying resilience theory to learning contexts during a pandemic: Overcoming Challenges, Social Engagement, Optimism and Positive Attitude, Flexibility and Adaptation, and Support from the Surrounding Environment. Implementation of these principles can help create learning environments that support student resilience, even in the midst of rapid and unpredictable change, such as those experienced during the pandemic.

Many studies have investigated the use of devices such as laptops and smartphones used for independent learning (Chan et al., 2015). Students have adequate facilities to carry out online learning. The ability of laptops and smartphones to access the internet allows students to follow the learning carried out in the form video conferencing as well as those carried out in virtual classes using the service learning applications available online (Gökçeşarlan et al., 2016). Even though the use of devices can support the online learning process, there are several things that must be considered, including the possibility of negative impacts misuse and overuse of devices. This raises concerns of negative effects use of gadgets and social media such as the possibility of exposure to wrong information and not paying attention during study as a result of playing social media (Siddiqui & Singh, 2016). The use of gadgets properly can help students to understand subject matter independently, so as to increase achievement in the academic field. Learning achievement always used in knowing the success of student learning at school, learning achievement is a value that shows the highest ability in learning achieved according to the ability of students to do something at a certain time (Sudaryana, 2016).

Learning independence refers to the ability of students to organize and manage their own learning without too much involvement from the teacher. Learning independence encourages students to become more aware of their own learning process. They learn to understand how they learn, identify effective strategies, and evaluate their progress. This can help students develop strong metacognitive abilities and be able to improve their understanding of the subject matter.

Learning independence helps develop problem-solving skills that are important in everyday life and in the future (Kopzhassarova et al., 2016). Students who are independent in learning tend to be more flexible and creative in their approach to learning. They can adapt to changing situations and look for innovative solutions.

Previous research found an interrelated relationship between learning independence and achievements (Handayani & Hidayat, 2019). Students with good learning independence will have a high level of learning achievement. Conversely, students with poor learning independence have low learning achievements in physics. Other research finds a significant positive effect between learning independence and achievement (Ningsih & Nurrahmah, 2016). Several factors cause high learning achievements, among others: students may cheat on their friends during the test so that learning independence becomes low due to dependence on their friends. There is also an attitude of high independence but low learning achievements. At the time of the test, students with low abilities in dealing with existing problems will get low learning achievements, but they do not depend on their friends to do tests. This shows students have high learning independence. However, independent learning is not the only factor that can improve student learning achievements. But there are other factors, namely internal and external factors, that affect student learning achievements during distance learning physics at Vocational High School in Bantul, Yogyakarta.

Conclusion

The learning independence at Vocational High School in Bantul, Yogyakarta, is included in the medium category with an average of 59% on the six indicators of learning independence. The implementation of distance learning due to the COVID-19 pandemic is still not going well. This research shows that students still have enough confidence and responsibility to learn online. Their offline learning habits make them unable to be replaced online, because students must have their own readiness and self-discipline in carrying out distance learning.

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Author Contributions

FK discovered problems in school, compiled research instruments, retrieved research data, analyzed data, and built manuscripts. HK reviewed and monitored the research progress and provided input on the research. ADR reviewed and edited the language and reviewed the articles that had

been compiled. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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