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RESEARCH ARTICLE

An Investigation of Learning Independence, Motivation, and Physics Learning Outcomes among Students of SMKN 3 Soppeng: A Descriptive Correlational Study

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Abstract

Education is essential for developing self-sufficient students who can pursue their academic goals without significantly depending on outside assistance. In the context of teaching physics, where students frequently struggle with motivation and grasping complicated concepts, this element is very important. The purpose of this study is to examine how learning independence and motivation affect the physics learning outcomes of SMK Negeri 3 Soppeng students in the eleventh grade. Saturated sampling was used to choose 11th grade students from the Computer and Network Engineering department for the 2022–2023 academic year. The research uses a descriptive correlational quantitative method. Learning outcome exams in physics and learning independence and motivation questionnaires were used to gather data. Descriptive and inferential statistics, such as multicollinearity, linearity, and normality tests, were used in the data analysis. Although learning independence contributed only 0.0106% to physics learning outcomes, the results showed a positive and significant association (r = 0.103) between learning independence and learning outcomes. This suggests that other factors may also be important. These results emphasize how critical it is for teachers to create plans that increase students' drive and independence in their learning, since this could lead to better learning outcomes for them when it comes to physics. This study also emphasizes how important it is to take into account additional variables that may affect students' learning outcomes.

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INTRODUCTION

Education is the process of helping students change their behavior so they can become autonomous, mature humans. Article 1 of Indonesian Constitution Number 20 of 2003 states that education is an intentional and planned endeavor to establish a learning environment and learning process so that students actively develop their potential to have moral strength, intelligence, self-control, personality, and noble character—skills needed by the community, state, nation, and themselves. The value of developing independent people, particularly in the area of learning, is one of the purposes and goals of national education. According to Slameto (2013), learning is the process by which an individual makes an effort to modify their general behavior as a result of their interactions with the environment. In this instance, learning can be done on your own. It's critical for learners to adopt an attitude of learning independence. Students' academic performance, motivation, and overall learning will all improve if they are given the chance to pursue high levels of learning independence (Sundayana, 2016). According to Nurlia (2017), who cites prior research, students with high levels of learning independence are anticipated to be able to take significant actions to aid in their own understanding of the subject matter more rapidly and readily.

One of the mindset components of character education is now learning independence. To be more precise, the government defines the attitude of learning independence as the willingness for people to learn on their own initiative in an effort to internalise knowledge without relying on or receiving direct guidance from others in Ministry of Education Regulation Number 41 of 2007. Learning outcomes that are effective are significantly influenced by learning resources and learning independence. High levels of learning independence make it easier for pupils to comprehend theories and concepts and make learning more engaging, which increases motivation to learn. The lack of motivation of students towards physics lessons is due to almost all of the content of physics lessons are formulas that are difficult to understand and difficult to remember. Learning motivation is one of the impulses that comes from within students that can provide changes in learning so that the desired goals in learning are achieved (Susanto, 2016). In line with research according to Meliza (2021), which states that this desire or drive is a motivation that can function as a driver of effort to achieve a good achievement.

Learning outcomes, which can be assessed using instruments or specific examinations, are the degree of accomplishment attained from an endeavour or activity that might bring emotional fulfilment. After teaching and learning activities are completed, learning outcomes are the capacity to meet predetermined indicators (Rambega, 2016). A number of elements influence the process of achieving learning outcomes. During the learning process, a student's identity can be influenced by various factors such as intelligence or cognitive ability, motivation, talent, curiosity, and independent attitudes. According to Sanita (2021), there is a positive and significant relationship between learning independence and student learning outcomes in the study of physics, as indicated by the significant testing that revealed a significant correlation between the two. Ramadhanti (2022) asserts, however, that there is a strong and positive correlation between physics learning outcomes and student motivation for learning.

Based on initial observations made at SMK Negeri 3 Soppeng, students only learn physics as a product, memorise concepts, theories and laws, and are oriented towards memorization. In a process to achieve learning outcomes is strongly influenced by several factors, namely internal and external. External factors such as family background, school and community. Internal factors such as intelligence or cognitive ability, independence attitude, talent, interest and motivation. In this case the researcher focuses more on the attitude of independence and motivation of students. Facts in the field show that students tend to be lazy to think independently and lack motivation to learn, especially in physics learning at school. This research is important to study because based on preliminary observations show that students at SMK Negeri 3 Soppeng tend to be lazy to think independently and lack motivation to learn, especially in physics learning. Because independence and learning motivation have an important role in learning outcomes. Students are also less interested in learning physics lessons because they think that physics is difficult, causing low physics learning outcomes.

According to Taa (2021), the learning process at school in physics subjects until now has not provided satisfactory results. This happens because students tend to be silent and do not answer questions given by the teacher, which shows that students have interest and motivation in learning physics. In addition, according to Fauziah (2021), it states that students with high independence can be predicted to have high learning motivation as well, on the other hand, low student learning independence can predict that these students have low learning motivation. In line with previous research by Setyaningsih (2022), it is stated that there is an effect of motivation on physics learning outcomes, as well as the effect of learning independence on physics learning outcomes. The existence of a combination between learning motivation variables and learning independence will provide the second highest contribution when compared to the contribution provided by a combination of other variables. This means that even though in the second hypothesis learning motivation is the lowest contribution, the combination given by learning motivation and learning independence is the second highest contributor (Selimayati, 2021).

Prior studies have demonstrated a positive correlation between learning outcomes in physics and learning desire and independence. Some variables, such as the impact of learning independence and learning motivation on joint physics learning outcomes, have not yet been well investigated. Prior research (Alimudin et al., 2022; Hänze and Berger, 2007; Jurik et al., 2014; Asmar et al., 2023; Sturges et al., 2016) only looked at the link between learning independence and learning motivation with physics learning outcomes independently. Research that looks at these two aspects' combined effects on physics learning outcomes has not been done. The findings of earlier research also indicate that high levels of student freedom and drive to learn correspond to high levels of learning outcomes. Some claim that although learning outcomes are low, independence and motivation are great.

Thus, the purpose of this study was to investigate how learning independence and learning motivation interact to affect the learning results of physics. It is anticipated that this study will advance knowledge of the connection between learning motivation, learning

independence, and physics learning outcomes. Additionally, it is anticipated that the study's findings would be applied to the creation of instructional plans that will enhance students' physics learning objectives. According to the problem description given above, teachers must be aware of the best ways to help students become more independent and motivated, as this will improve their learning outcomes—particularly in physics classes.

METHOD

The research method used in this research is quantitative research which is descriptive correlational. The research site is SMK Negeri 3 Soppeng which is located in Cangadi, Soppeng City, Sulawesi Selatan Province, Indonesia. The implementation of this research was carried out in the even semester of the 2022/2023 Grade XI, Majoring in Computer and Network Engineering (TKJ).

Research Design and Procedures

The design of this research is in the form of a double paradigm with two independent variables and one dependent variable. Furthermore, the researcher prepared things needed to conduct research such as communicating with the school, taking care of research permits, compiling research instruments, and other things that support research activities. Then, researchers gave tests in the form of physics lesson questions and questionnaires in the form of statements of learning independence and learning motivation to students in the class that became the research sample. After distributing tests and questionnaires, researchers conducted statistical analysis tests which were carried out descriptively and inferentially. The data that has been obtained by researchers is analysed using descriptive and inferential statistical methods.

Population and Sample

The study's population comprised 99 students from 3 classes in class XI Computer and Network Engineering (TKJ) throughout the 2022–2023 academic year. This study employed a saturated sampling method from Non-Probability Sampling. Sugiyono (2012) defines saturated sampling as the use of all members of the population as samples in a sampling technique.

Data Collection and Instrument

Data collection techniques used in this study were tests and questionnaires. The research instruments used in this study were non-test instruments in the form of questionnaires, namely to reveal the variables of learning independence and learning motivation. The questionnaire used is a closed questionnaire, because the respondent just chooses the answers that are available and it is hoped that the respondent will choose the answer that matches the actual situation. This study also used test instruments in the form of tests used to collect quantitative data through written tests. This test instrument aims to determine the learning outcomes of students in physics lessons even semester of the 2022/2023.

Data Analysis

Both descriptive and inferential statistical analysis were employed in this study's data analysis. Finding the average (mean), maximum score, minimum score, standard deviation, variance, and categorisation are the statistical formulae utilised in descriptive analysis. On the other hand, inferential analysis is used to evaluate the analysis's presumptions in order to produce findings that differ from the presumptive truth. The normality test, linearity test, multicollinerity test, and hypothesis testing are necessary to meet these requirements. The purpose of the normality test is to ascertain whether or not the data acquired is normally distributed, or if the data collected in the field is consistent with specific theoretical distributions. while doing the chi squared test to determine normalcy. In order to perform forecasting, the linearity test is utilised to determine whether the regression line between the independent and dependent variables is a straight line. According to the test requirements, the distribution is linearly patterned if the F test value is less than the F table value.

RESULT AND DISCUSSION

Result

The findings of this descriptive statistical analysis include the mean, maximum, minimum, variance, standard deviation, and frequency distribution of the data on students' learning outcomes in physics, learning independence, and learning motivation. Additionally, the results of an inferential analysis are presented to test the hypothesis.

Overview of Students' Learning Independence

An overview of learning independence is described in 18 valid statements. The results showed the average score (mean) of respondents on the learning independence variable was 53.76 with a standard deviation of 6.60 the highest score (maximum) was 68 and the lowest score (minimum) was 34. The answers of students (respondents) on the learning independence test were transformed into score intervals. The following is presented in the descriptive analysis of learning independence in Table 1.

Table 1. Descriptive statistics of students' learning independence score

Statistical	Score Statistics
Number of Samples	99
Theoretical maximum score	72
Theoretical minimum score	18
Empirical maximum score	68
Empirical minimum score	34
Average	53.76
Standard deviation	6.60
Variance	43.55

The statistical data presented in Table 1 shows that the average score achieved by students is 53.76 in the high category. The following are details of the data on students' learning independence presented in the form of a frequency distribution table.

Table 2. Frequency distribution of physics learning independence

Score Interval (%)	Interval Score	Interpretation Criteria	Frequency	Percentage (%)
0 – 20	18 – 28	Very low	0	0.0
21 – 40	29 – 39	Low	1	1.0
41 – 60	40 – 50	Fair	30	30.0
61 – 80	51 – 61	High	58	58.6
81 – 100	62 – 72	Very high	10	10.1

An Overview of Students' Learning Motivation

An overview of learning motivation is described in 15 valid statements. The results showed that the average score (mean) of respondents on the learning independence variable was 43.84 with a standard deviation of 4.92 the highest (maximum) score was 55 and the lowest (minimum) score was 28. Students' answers (respondents) on the learning independence test are transformed into score intervals. The following is presented in the descriptive analysis of learning independence in Table 3.

Table 3. Descriptive statistics of learners' motivation score

Statistical	Score Statistics
Number of Samples	99
Theoretical maximum score	60
Theoretical minimum score	15
Empirical maximum score	55
Empirical minimum score	28
Average	43.84
Standard deviation	4.92
Variance	24.22

The statistical data presented in Table 3 shows that the average score achieved by students is 43.84 in the high category. The following are details of student learning motivation data presented in the form of a frequency distribution table (Table 4).

Table 4. Frequency distribution of physics learning motivation

Score Interval (%)	Interval Score	Interpretation Criteria	Frequency	Percentage (%)
0 – 20	15 – 23	Very low	0	0.0
21 – 40	24 – 32	Low	1	1.0
41 – 60	33 – 41	Fair	30	30.0
61 – 80	42 – 50	High	60	60.6
81 – 100	51 – 60	Very high	8	8.0

Overview of Physics Learning Outcomes of Students

An overview of physics learning outcomes is described in 20 valid questions. The results showed the average score (mean) of respondents on the learning independence variable was 9.74 with a standard deviation of 2.78 the highest score (maximum) was 15 and the lowest score (minimum) was 2. The answers of students (respondents) on the physics learning outcomes test are transformed into score intervals. The following is presented in the descriptive analysis of learning independence in Table 5.

Table 5. Descriptive statistics of physics learning outcome

Statistical	Score Statistics
Number of Samples	99
Theoretical maximum score	20
Theoretical minimum score	0
Empirical maximum score	15
Empirical minimum score	2
Average	9.74
Standard deviation	2.78
Variance	7.73

The statistical data presented in Table 5 shows that the average score achieved by students is 9.74 in the sufficient category. The following are details of the data on students' physics learning outcomes presented in the form of a frequency distribution table (Table 6).

Table 6. Frequency distribution of physics learning outcomes

Score Interval (%)	Interval Score	Interpretation Criteria	Frequency	Percentage (%)
0 – 20	0 – 4	Very low	4	4.0
21 – 40	5 – 8	Low	23	23.2
41 – 60	9 – 12	Fair	54	54.5
61 – 80	13 – 16	High	18	18.1
81 – 100	17 – 20	Very high	0	0.0

Hypothesis Testing

The hypothesis testing results of the relationship between learning independence and physics learning outcomes of students of SMKN 3 Soppeng are as follows. The results of the correlation test calculation obtained an r value of 0.103. Because the r value obtained is not equal to 0, then H_a (there is a relationship) is accepted and H_0 (no relationship) is rejected. The interpretation of the value of r = 0.103 based on product moment correlation. Then the two variables have a relationship that is classified as very low with the coefficient of determination, namely $r^2 = (0.103)^2 = 0.011\%$. This means that the contribution of learning independence to the learning outcome variable is 0.011% and the rest is determined by other variables. In addition, based on the significance test using the t test obtained:

Table 7. The t-test value between learning independence and physics learning

t_{count}	t_{table}	Testing Criteria	Description
1.020	1.985	If $t_{count} > t_{table}$ then Ha is rejected (H_0 is accepted)	$t_{count} > t_{table}$ (1.020 < 1.985) H_0 is accepted

Based on Table 7, it is known that the value of $t_{count} < t_{table}$ (1.020 < 1.985) H_0 is accepted. This means that there is no significant relationship between learning independence and physics learning outcomes of class XI TKJ SMKN 3 Soppeng.

The hypothesis test results of the relationship between learning motivation and physics learning outcomes of students of SMKN 3 Soppeng are as follows. The results of the correlation test calculation obtained an r value of 0.003. Because the r value obtained is not equal to 0, then H_a (there is a relationship) is accepted and Ho (there is no relationship) is rejected. The interpretation of the value of r = 0.003 based on product moment correlation. Then the two variables have a relationship that is classified as very low with the coefficient of determination, namely $r^2 = (0.003)^2 = 0.000\%$. This means that the contribution of learning motivation to the learning outcome variable is 0.000% and the rest is determined by other variables. In addition, based on the significance test using the t test obtained:

Table 8 The t-test value between learning motivation and physics learning outcomes

t_{count}	t_{table}	Testing Criteria	Description
0.029	1.985	If $t_{count} > t_{table}$ then Ha is rejected (H_0 is accepted)	$t_{count} > t_{table}$ (0.029 < 1.985) H_0 is accepted

Based on Table 8, it is known that the value of $t_{count} < t_{table}$ (0.029 < 1.985) H_0 is accepted. This means that there is no significant relationship between learning motivation and physics learning outcomes of class XI TKJ SMKN 3 Soppeng.

The hypothesis test results of the relationship between learning independence and motivation toward physics learning outcomes are as follows. The results of the correlation test calculation obtained an r value of 0.794. Because the r value obtained is not equal to 0, then Ha (there is a relationship) is accepted and Ho (no relationship) is rejected. The interpretation of the value of r = 0.165 based on product moment correlation. Then the two variables have a relationship that is classified as very low with the coefficient of determination, namely $r^2 = (0.165)^2 = 0.027\%$. This means that the contribution of learning independence and learning motivation to learning outcomes is equal to = 0.027% and the rest is determined by other variables. In addition, based on the significance test using the t test obtained:

Table 9. T-test between learning independence and motivation with learning outcomes

t_{count}	t_{table}	Testing Criteria	Description
1.663	1.985	If $t_{count} > t_{table}$ then Ha is rejected (H_0 is accepted)	$t_{count} < t_{table}$ (1.663 < 1.985) H_0 is accepted

Based on Table 9, it is known that the value of $t_{count} < t_{table}$ (1.663 < 1.985) H_0 is accepted. This means that there is no significant relationship between learning independence and learning motivation with physics learning outcomes of class XI TKJ SMKN 3 Soppeng.

Discussion

Learning Independence, Learning Motivation, and Physics Learning Outcomes

Based on the results of descriptive statistical analysis illustrates that in general the learning independence of class XI students of SMKN 3 Soppeng is in the high category. This can be shown by the average score of each indicator of learning independence. This independence can increase to be great if the relationship is getting stronger. The results of descriptive statistical analysis illustrate that in general the physics learning motivation of students in class XI TKJ SMKN 3 Soppeng is in the high category. Learning motivation that exists in students can develop depending on the desire of these students to carry out learning activities. The results of descriptive statistical analysis illustrate that in general the physics learning outcomes of XI TKJ SMKN 3 Soppeng are sufficient. Student learning outcomes have a relationship with learning independence and student learning motivation. So the better the learning independence and the higher the learning motivation of students, the higher the physics learning outcomes obtained by students.

Student learning motivation has a positive influence on learning independence, which means that if learning motivation increases, the level of student learning independence will also increase (Roosilawati and Hartono, 2021; Rafiola, et al., 2020). According to Wahyuni (2020), it states that in addition, learning independence is one of the determining factors for student learning success at school. With the encouragement of learning motivation, it needs to be increased in order to achieve learning success, the more learning motivation students have, the more active and enthusiastic the students are in learning and vice versa (Prasetyo, 2018). So the researcher can draw conclusions from some of the opinions above that the independence and motivation of students to learn at school are aspects that affect student learning outcomes. The better the independence and motivation to learn, the more it affects the success rate of student learning outcomes.

Relationship between Learning Independence and Physics Learning Outcomes

It shows why there isn't a positive correlation between the learning independence variable and the physics learning outcomes of SMKN 3 Soppeng class XI pupils, based on the findings of hypothesis testing. The study's findings, which display the t test correlation coefficient's value, demonstrate this. It can be concluded that there is no significant association between learning independence and the physics learning outcomes of students in class XI TKJ SMKN 3 Soppeng because the value of $t_{count} > t_{table}$. This demonstrates that there are numerous additional elements that also have an impact on learning outcomes in physics, in addition to learning independence. Both internal and external influences can have an impact on learning results. According to Permata (2022) internal factors are factors that come from individuals including health, intelligence, the presence of interests and talents, learning motivation, learning habits carried out in ways of learning. External factors are factors that come from outside the individual including the social environment

such as family, school and society. There is a positive relationship that indicates a unidirectional relationship between learning independence and learning outcomes, the better the learning independence, the better the learning outcomes. In line with Woi's research (2019) states that high learning independence will get high learning outcomes, on the contrary, if learning independence is low, learning outcomes are low.

Researchers might draw the conclusion that learning outcomes and learning independence are related based on some of these earlier studies. Asmar et al. (2023) assert that certain instances indicate that there is no correlation between learning results and learning independence. This is seen in the way that students participate in their education. High learning results should also be produced by students who have a strong sense of independence (Sari and Zamroni, 2019). Therefore, the researcher came to the additional conclusion in this study that there was no meaningful correlation between the physics learning outcomes of XI TKJ SMKN 3 Soppeng students and learning independence.

Relationship between Learning Motivation and Physics Learning Outcomes

The hypothesis testing explains why there isn't a positive correlation between the learning motivation variable and the physics learning outcomes of XI TKJ SMKN 3 Soppeng pupils, based on the findings of hypothesis testing. The study's findings, which display the t test correlation coefficient's value, demonstrate this. It is possible to conclude that there is no significant association between students' learning results in physics in class XI TKJ SMKN 3 Soppeng and their motivation to learn because the value of $t_{count} > t_{table}$. According to Hasniati's (2017) earlier research, there is little correlation between learning results and learning motivation. The fact that students' motivation fluctuates may be the cause of the low contribution of learning motivation to bettering learning outcomes. After receiving inspiration, students' motivation levels will rise; but, if they do not receive motivation for an extended period of time, their motivation levels will decline. This has a significant impact on raising learning objectives (Wahyudi, 2016). According to earlier research by Permanda (2021), there is no significant correlation between student learning outcomes and motivation; rather, the relationship between the two variables is negative, meaning that a decrease in motivation will likewise result in an increase in student learning outcomes.

Learning outcomes and motivation have no association, or a very weak correlation, indicating that there is no relationship at all (Aulia, 2021). On the other hand, Aprily (2020) asserts that a connection exists between student learning results and learning motivation. Researchers can conclude that there is a relationship between learning results and learning motivation based on the opinions of multiple prior studies. However, because there are other elements besides motivation that affect learning results, high levels of learning motivation do not entirely account for learning outcomes. Therefore, the researcher came to the additional conclusion in this study that there is no significant correlation between the physics learning outcomes of XI TKJ SMKN 3 Soppeng students and their motivation to learn.

Relationship between Learning Independence and Learning Motivation with Physics Learning Outcomes

The hypothesis testing results indicate that there is no significant correlation between the independent variables of learning independence and learning desire and the physics learning outcomes of SMKN 3 Soppeng pupils. The study's findings, which display the t test correlation coefficient's value, demonstrate this. It can be inferred that there is no significant correlation between learning independence and learning motivation and the physics learning outcomes of students in class XI TKJ SMKN 3 Soppeng because the value of $t_{count} < t_{table}$. According to earlier studies, learning independence and learning motivation do not have a contemporaneous association (together) with learning outcomes (Jafar, 2020). Meanwhile, Batubara (2021) reports that the factors of learning independence and motivation have a substantial link. Because of the correlation coefficient number between students' learning independence and accomplishment motivation, learning independence increases with achievement motivation.

Learning independence and learning motivation tend to produce good learning outcomes, otherwise learning independence and lack of learning motivation will produce low learning outcomes. So it can be concluded that if students have great independence and motivation towards the field of physics study, these students will focus their attention on the field of physics study and be more active in studying this field of study so that their achievements will be satisfactory. So it can be concluded that there is no significant relationship between learning independence and learning motivation with physics learning outcomes of students XI TKJ SMKN 3 Soppeng. This study did not control other variables that can affect learning outcomes, such as internal factors (intelligence, interest, talent, and so on) and external factors (family environment, school environment, and so on).

Based on the discussion, some practical implications can be drawn that physics learning at SMKN 3 Soppeng needs to be reviewed to see if there are other factors that affect physics learning outcomes, in addition to learning independence and learning motivation. Physics teachers at SMKN 3 Soppeng need to increase efforts to improve learning independence and learning motivation of students. Learners need to be encouraged to increase their learning independence and learning motivation through various activities, such as tutoring, extracurricular activities, and other activities related to increasing physics learning independence and motivation.

CONCLUSION

The research findings on learning independence and physics learning motivation of students in class XI TKJ SMKN 3 Soppeng are in the high category, according to the findings of the previous chapter's study. Their physics learning outcomes, however, were only in the middle range in spite of this. Additionally, the physics learning outcomes of these children do not show a favourable and substantial association between learning freedom and learning desire. Their physics learning results did not exhibit a positive and significant link with either learning independence or learning motivation taken combined.

To gain a deeper understanding of other factors, it is necessary to conduct similar research with additional research instruments related to internal and external factors. This way, definitive conclusions can be drawn regarding the reasons for the absence of a positive relationship.

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