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The Influence of Learning Interest, Emotional Intelligence and Achievement Motivation on Critical Thinking Skills in Physics of Grade XI Students

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Abstract: This research is an experimental research with the type of Ex Post Facto research, which aims to analyze the effect of learning interest on achievement motivation, learning interest on critical thinking skills, emotional intelligence on achievement motivation, emotional intelligence on critical thinking skills. Using a casual survey method with Path Analysis techniques. Based on the results of expert assessments, it is declared valid and suitable for use. Furthermore, the instrument that was declared valid by the expert was then tested on class XII students, after the instrument was tested and a valid instrument was obtained, then the valid instrument was tested on class XI students. Based on the results of this study, it was obtained that the critical thinking skills of students in Physics were in the moderate category, while Learning Interest, Emotional Intelligence, and Achievement Motivation were in the high category. From the results of the Path Analysis test between variables, it was obtained that there was an insignificant influence of interest in learning Physics on achievement motivation, there was an insignificant influence between interest in learning on critical thinking skills, there was a significant influence between emotional intelligence on achievement motivation, there was an insignificant influence between emotional intelligence on critical thinking skills, there was an insignificant influence between achievement motivation on critical thinking skills.

Keywords: Achievement Motivation; Critical Thinking Ability; Emotional Intelligence; Learning Interest

Introduction

Science education, especially in the field of Physics, to improve the quality and quality of education we should play an active role in advancing it, As we know Physics is a field of learning that discusses science, the universe (Cho & Baek, 2019); (Zhang & Wang, 2021); (Haleem et al., 2022), and events that occur which are stated in theories and proven by experiments. As a science that studies natural phenomena, physics also provides good lessons for humans to live in harmony based on natural laws (Zidny et al., 2020); (Somsikov & Azarenko, 2021), Learning is a process of interaction between students and educators, either through learning media (Abdulrahaman et al., 2020), learning resources or the environment and learning, The process of interaction between students and educators is an important factor in the success of learning (Xiao et al., 2023), to see the interaction, students must really understand the material presented by the educator, students' understanding and mastery of the theory is the key to the sustainability of the interaction process (Su et al., 2023); (Young & Malone, 2023); (Gunawardena et al., 2024).

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Physics learning not only emphasizes mastery of concepts, but must also hone critical thinking skills so that formulas (Witte et al., 2024); (Putri et al., 2022); (Basileo et al., 2024), questions, and problems in the form of experiments given can be solved logically and can consider making decisions correctly and quickly. Physics learning, learning interest, emotional intelligence and achievement motivation are very much needed by students to improve students' critical thinking skills (Jia & Tu, 2024); (Youssef et al., 2024); (Dessie et al., 2024), in solving problems, questions given by educators are very much needed critical thinking skills, because students in Physics learning tend to work on questions that require understanding and thinking in solving problems in the questions (Susanti et al., 2021); (Aflalo, 2021). Based on the problems obtained, Physics subjects are very enjoyable but also sometimes less enjoyable.

Students say that Physics subjects are fun when doing practicums (Wiwin & Kustijono, 2018); (Indrasari et al., 2022); (Liswar et al., 2023), but less enjoyable when discussing theories, formulas and questions that often make them difficult to answer, so that the learning outcomes obtained by students are less than satisfactory, this is because the critical thinking skills possessed by students are low. Lack of interest in learning, emotional intelligence and achievement motivation possessed by students are one of the factors in the lack of critical thinking skills possessed by students.

Method

Type of Research and Research Design

The type of research is Ex Post Facto. Using the causal survey method with path analysis techniques. The research design used is:

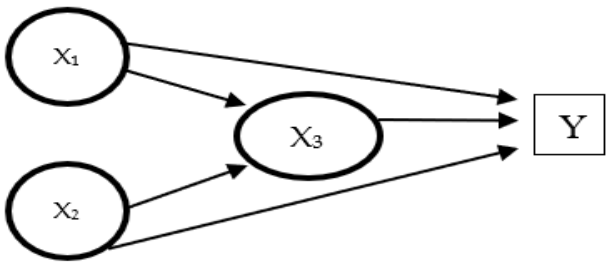

Figure 1. Paradigm of Relationships Between Variables

Information:
Y: Critical thinking ability
X1: Interest in learning
X2: Emotional intelligence
X3: Achievement motivation

Based on Figure 1, it is shown that variable X1 is an exogenous variable that has a direct and indirect relationship with Y. It is said to have an indirect relationship with Y because X1 to reach variable Y must pass through an intermediate variable, namely: (X3). In this case, Y is an endogenous variable, if viewed from variable X1, to X3, then X1 is an exogenous variable and variable X3 is an endogenous variable. If viewed from variable X3 to Y, then X3 is an exogenous variable and Y is an endogenous variable. It is also shown that variable X2 is an exogenous variable that has a direct and indirect relationship with Y. It is said to have an indirect relationship with Y because X2 to reach variable Y must pass through another mantra variable, namely (X3). In this case, Y is an androgen variable. If viewed from variable X2 to X3, then X2 is an exogenous variable and variable X3 is an endogenous variable. Meanwhile, if viewed from variable X3 to Y, then X3 is an exogenous variable and Y is an endogenous variable.

Population and Sample

The population in this study were 235 students of class XI UPT SMAN 4 Bantaeng (Sugiyono, 2019). The sampling technique used in this study was the nonprobability sampling technique. (Arikunto, 2013) To determine the minimum sample size from all population numbers, the Slovin formula is used, namely:

$$n = \frac{n}{1+N\ e^2} \quad (1)$$

Description:
n : Minimum sample size
N : Population size
e : Percentage of allowance for inaccuracy due to sampling error that can still be tolerated
Based on the Slovin formula, the sample obtained in this study was 148 respondents in the following table:

Table 1. Sample of Class XI UPT SMAN 4 Banteng

Class	Amount
XI 1	17
XI 2	26
XI 3	20
XI 4	19
XI 5	22
XI 6	29
XI 7	15
Total	148

Results and Discussion

The results of the data obtained in the study were then analyzed to answer the hypothesis in this study. By using descriptive analysis tests, classical assumption tests, namely normality tests, linearity tests,

multicollinearity tests, then continued using path analysis tests. The results of the descriptive analysis are in Table 2.

Table 2. Descriptive Analysis Test

Category	Interest in Learning	Emotional Intelligence	Motivation to Achieve	KBK
Min Theoretical Score	22	22	22	0
Max Theoretical Score	110	110	110	100
Min Empirical Score	53	68	60	46
Max Empirical Score	109	105	98	95
Mean	76.99	88.74	78.66	73.37
Standard Deviation	9.62	7.07	8.27	11.19
Variance	92.72	50.08	68.40	

Descriptive analysis test was conducted using SPSS application by finding theoretical max score, theoretical min score, empirical min score, empirical max score, mean, standard deviation and data variance.

Table 3. Data Normality Test

Variables	Value of Sig.	Condition	Conclusion
Learning Interest	0.200	$> \alpha(0.05)$	Normal
Emotional Intelligence	0.200	$> \alpha(0.05)$	Normal
Achievement Motivation	0.200	$> \alpha(0.05)$	Normal
Critical Thinking Skills	0.064	$> \alpha(0.05)$	Normal

The results of the normality test analysis using the Kolmogorov-Smirnov formula. The table above shows that the sig value of learning interest is at 0.200 < 0.05, emotional intelligence 0.200 < 0.05, achievement motivation 0.200 < 0.05, the sig value of critical thinking ability 0.064 < 0.05 is normally distributed.

Table 4. Linearity Test

Variables	The value of sig.	Condition	Conclusion
X2-X3	0.42	$> \alpha(0.05)$	Linear
X1-X3	0.22	$> \alpha(0.05)$	Linear
X1-Y	0.47	$> \alpha(0.05)$	Linear
X2-Y	0.59	$> \alpha(0.05)$	Linear
X3-Y	0.39	$> \alpha(0.05)$	Linear

Table 5. Multicollinearity Test

Variable	VIF Value	*Tolerance*
X1 = Learning Interest	.991	1.009
X2=Emotional Intelligence	.711	1.406
X3=Achievement Motivation	.713	1.402

Multicollinearity test is conducted to determine whether the variables have multicollinearity. Based on the results of the data multicollinearity test, it is known that the VIF value of each independent variable is less than 10 and the Tolerance value of each variable is greater than 0.10. so that the results of the multicollinearity test indicate that overall the variables used in this study do not have multicollinearity. Path Analysis Test The analysis technique used in this study, Path Analysis, is a regression analysis for casual relationships between variables. Path analysis is used to examine the direct and indirect effects that have been hypothesized as a result of the influence of treatment on variables, the path analysis technique used is by using the SPSS statistical program. after testing the direct and indirect effects between variables, the hypothesis is tested. The proposed statistical hypothesis test is intended to determine whether the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted or vice versa. To test the hypothesis, a partial t-test and a simultaneous F-test will be used as well as testing the indirect effects of path analysis. From the hypothesis testing, it was found that :

The Influence of Learning Interest (X1) on Achievement Motivation (X3)

Based on the results of the study, it can be explained that the significance value of learning interest on achievement motivation is 0.36 <0.05 so that it can be stated that H0 is accepted and H1 is rejected. Thus, it can be stated that learning interest (X1) does not have a significant influence on achievement motivation (X3) of class XI students of UPT SMAN 4 Bantaeng

The Influence of Emotional Intelligence (X2) on Achievement Motivation (X3)

Based on the results of the study, it can be explained that the significance value of emotional intelligence on achievement motivation is 0.0001 <0.05 so that it can be stated that H0 is rejected and H1 is accepted. Thus it can be stated that emotional intelligence (X2) has a significant influence on achievement motivation (X3) of class XI students of UPT SMAN 4 Bantaeng

The Influence of Learning Interest (X1) on Critical Thinking Ability (Y)

Based on the results of the study, it can be explained that the significance value of learning interest (X1) on critical thinking ability (Y) is 0.53> 0.05 so that it can be stated that H0 is accepted and H1 is rejected. Thus it can be stated that learning interest (X1) does not have a significant influence on critical thinking ability (Y) of class XI students of UPT SMAN 4 Bantaeng

The Influence of Emotional Intelligence (X2) on Critical Thinking Ability (Y)

Based on the results of the study, it can be explained that the significance value of emotional intelligence (X2) on critical thinking ability (Y) is 0.46> 0.05 so that it can be stated that H0 is accepted and H1 is rejected. Thus it can be stated that Emotional Intelligence (X2) does not have a significant influence on the critical thinking ability (Y) of class XI students of UPT SMAN 4 Bantaeng.

The Influence of Achievement Motivation (X3) on Critical Thinking Ability (Y)

Based on the results of the study, it can be explained that the significance value of achievement motivation (X3) on critical thinking ability (Y) is 0.311> 0.05 so that it can be stated that H0 is accepted and H1 is rejected. Thus it can be stated that achievement motivation (X3) does not have a significant influence on critical thinking ability (Y) of class XI students of UPT SMAN 4 Bantaeng.

The Influence of Learning Interest (X1) on Critical Thinking Ability (Y) Achievement Motivation (X3)

Based on the results of the study, it can be explained that the direct influence value of -0.0064 is smaller than the indirect influence of 0.0004 so that it can be stated that achievement motivation (X3) is able to mediate learning interest (X1) on critical thinking ability (Y) of Class XI students of UPT SMAN 4 Bantaeng.

The Influence of Emotional Intelligence (X2) on Critical Thinking Ability (Y) Achievement Motivation (X3)

Based on the results of the study, it can be explained that the direct influence value of -0.053 is greater than the indirect influence of -0.029 so that it can be stated that achievement motivation (X3) is not able to mediate emotional intelligence (X2) on critical thinking ability (Y) of Class XI students of UPT SMAN 4 Bantaeng. Critical thinking skills possessed by students are very important in the learning process (Nurfaizah et al., 2022); (Widya Karmila Sari Achmad & Unga Utami, 2023). Not only in the learning process but critical thinking in the school environment, family, and community environment is very much needed. The use of critical thinking can help students interact and solve a problem well without any worries (Almulla, 2023); (Palinussa et al., 2023).

Critical thinking skills can improve analytical skills, creativity, utilize ideas or information and seek additional relevant information and self-reflection (Simonovic et al., 2023); (Karunarathne & Calma, 2024). Improving critical thinking skills in Physics learning, there are several factors that educators must consider, one of which is to see the learning interest, emotional intelligence, and achievement motivation possessed by the students, students' critical thinking skills can be seen if the students' interest is high in learning where learning interest according to (Syamsinar et al., 2023); (Fajari et al., 2020) defines learning interest as a concentration of attention that contains elements of feelings, pleasure, tendencies of the heart, unintentional desires that are active in nature to receive something from outside (environment) (Maurer et al., 2023); (Witte et al., 2024).

Emotional intelligence, good emotional control can help students think more easily, not influenced by detrimental things (Estrada et al., 2021). According to (O'Connor et al., 2019); (Brundin et al., 2022), emotional intelligence is a person's ability to understand and regulate moods so as not to paralyze the clarity of rational brain thinking, but is able to display several skills, both personal skills and interpersonal skills. In addition to interest in learning, emotional intelligence, achievement motivation also plays a role in improving critical thinking skills (Lamri & Lubart, 2023); (Van Laar et al., 2020); (Issah, 2018).

Achievement motivation according to (Witte et al., 2024); (Bandhu et al., 2024), argues that achievement motivation is "the drive in a person, both from within and from outside, to carry out learning activities and other activities as optimally as possible, and compete based on standards of excellence in order to achieve achievements with a commendable predicate or superior predicate" to awaken critical thinking skills, high achievement motivation is needed. Students who have high achievement motivation can encourage students to think critically in achieving a goal that is a driving point to be better among other students (Darling-Hammond et al., 2020); (Urhahne & Wijnia, 2023); (Brenner, 2022).

Conclusion

Based on the research, it can be concluded that there is no significant influence between learning interest, emotional intelligence, achievement motivation on critical thinking skills, learning interest on achievement motivation has no significant influence, emotional intelligence on achievement motivation has a significant influence. Learning interest on critical thinking skills through achievement motivation is able to mediate significantly, while emotional intelligence on critical

thinking skills through achievement motivation is not able to mediate.

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Author Contributions
M., conceptualized the research idea, research method, and analyzed the data. J and K. A., guided the writing of the review and editing, supervised and validated the instruments used in the research

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Conflicts of Interest
The authors declare no conflict of interest.

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