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Unveiling the Gender Gap : Investigating the Impact of GRIT and Learning Motivation on Economic Learning Achievement Among High School Students

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Abstract: This research aims to analyze the impact of GRIT and Motivation to learn on student achievement in economic subjects and to assess the role of gender as a moderating variable. This study used a survey method with a quantitative approach. The population in this study were grade X students in Purworejo Regency, Cluster random sampling obtained a sample of 142 students data collection techniques using questionnaires and tests. Data were analyzed using the IBM SPSS Version 25 application with hypothesis testing and the Moderated Regression Analysis (MRA) test. The results showed a significant impact of GRIT and learning motivation on learning achievement (®= 0.267, t-count = 2.864, p = 0.005), (®= 0.288, t-count = 3.092, p = 0.002). Furthermore, gender as a moderating variable can moderate and strengthen the impact of GRIT and learning motivation on learning achievement. The novelty of this study was the existence of GRIT variables tested on students (especially economics students), while other studies used Grit on employees and teachers. The results of this research could contribute to shaping the behavior of students with high strength, resilience, and motivation during economics learning to maximize the resulting learning achievement.

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Introduction

Learning is vital in shaping students' character and skills, including learning economic subjects at the senior high school level. Attention to psychological factors and individual character is increasingly important to improve student learning achievement. One concept that has received widespread attention in learning achievement is GRIT, introduced by Angela Duckworth (Park et al., 2020). In the face of the complexity of modern educational challenges, the development of psychological factors such as GRIT is becoming increasingly important to improve student achievement, as factors such as intellectual ability alone are insufficient to guarantee student success. Recent studies have begun to discuss the importance of non-cognitive factors in student academic success (Al-Mutawah & Fateel, 2018). GRIT refers to perseverance and passion in achieving long-term goals (Duckworth et al., 2007; A. Duckworth & Gross, 2014). Consistency of interest pertains to individuals' inclination to continuously pursue a goal, demonstrating resilience and determination in the face of obstacles and setbacks and maintaining steadfast effort and dedication to accomplish long-term objectives (Ayllón-Salas et al., 2023). The GRIT that Prio refers to is a person's formula for success. GRIT stands for Courage, Endurance, Initiative, & tenacity. Prio explained that GRIT is very important as a formula for success. For example, in the academic world, students who graduate with a high GPA may only perform well if they apply reasonable and appropriate knowledge management (Soepryaritno, 2021).

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Previous research has provided a solid foundation to support the claim that GRIT significantly impacts student achievement. Research by Duckworth & Gross (2014) indicated that students exhibiting high levels of GRIT tend to attain superior academic results compared to their counterparts who demonstrate lower levels of perseverance and resilience. Tough (2012) explained that non-cognitive skills such as GRIT can be more vital than cognitive skills in determining student success in the school environment. Light & Nencka (2019) the study revealed that GRIT benefits both high and low-achieving students, leading to improved academic performance. Perseverance and resilience positively influence academic achievement regardless of the student's initial performance level. Students with high levels of GRIT demonstrate enhanced perseverance in overcoming learning obstacles and sustaining motivation to achieve academic goals. This perseverance enables them to overcome challenges and focus on their academic objectives (Koc & Şimsir Gokalp, 2023). Tannoubi (2023) shows that GRIT has no significant effect on learning achievement, possibly caused by the difficulty and complexity of the academic process in physical education.

Motivation is another factor affecting learning achievement (Abdulghani et al., 2014). Motivation for learning is a crucial element that drives students to cultivate enthusiasm and focus in their daily activities, particularly noticeable among adolescents undergoing developmental transition (Gupta & Mili, 2016). However, a low level of learning motivation can be seen when students do not submit homework on time; some do not even do it after being given it by the teacher (Tambunan et al., 2018). Learning motivation is crucial in the learning process because it determines how much a person is motivated to complete learning tasks or activities (Banda & Nzabahimana, 2023). Rafiola et al. (2020) demonstrate that the learning motivation factor positively influences high school students' academic achievement by 25.6%. The literature shows that student learning motivation can vary depending on the domain or academic subject studied (Guo et al., 2021).

Students' drive to achieve learning achievement varies significantly depending on gender (Alamri, 2023). Kannangara et al. (2018) show that initially, there were findings that confirmed that female students had higher levels of GRIT than male students. It led to the idea that aspects of perseverance may vary between genders. However, a more recent study showed no significant difference in the level of GRIT among male and female students (Sigmundsson et al., 2021). The results of a study conducted by Martin et al. (2022) showed that females showed an advantage in perseverance of effort and higher levels of self-confidence during the learning process compared to males. However, men show higher motivation levels than women. In the case of learning motivation in related research (Voyer & Voyer, 2014). Male students have more internal and external motivation in math than in language, while females only have more internal motivation in math and language (Guo et al., 2021).

Initial research conducted in several high schools in Purworejo district found several problems that could be solved. Students in the learning process showed less active behavior, and there were still cases of students who often took longer to submit assignments to the teacher. These conditions then impact the decline in student grades and overall learning achievement. The teacher explained that daily tests and semester assessments failed to achieve maximum results because 30% of students had remedial issues. In addition, 25% of students should have collected assignments on time. The results of this interview indicate that students' learning motivation, perseverance, and independence have decreased, which is reflected in the suboptimal work on assignments and the frequent collection of assignments outside the specified time limit.

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Considering the results of this preliminary study and realizing the discrepancy of findings with previous research highlighting the relationship between GRIT, learning motivation, and learning achievement, this research then focused on developing psychological aspects that have an essential role in improving educational success. This research aims to analyze the impact of GRIT and Motivation to learn on student achievement in economic subjects and to assess the role of gender as a moderating variable.

Research Method

This study used a survey method with a quantitative approach, focusing on the examination of numerical data derived through statistical methods. It was conducted within the realm of inferential research or hypothesis testing, aiming to ascertain the significance of the relationships among the variables under investigation. The hypothesis that had been determined was tested using statistical tests.

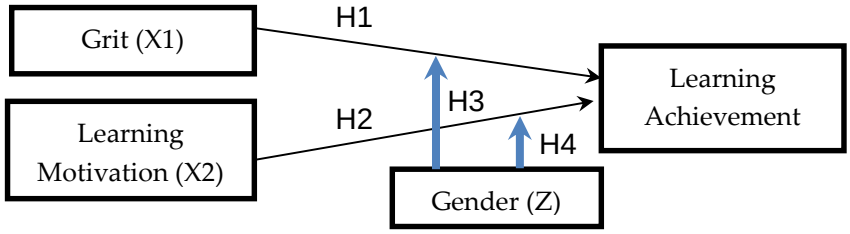

Figure 1. The Conceptual Framework

The independent variables in this study were GRIT and learning motivation. The dependent variable was learning achievement, and the moderating variable in this study was gender. The GRIT variable questionnaire adopted the questionnaire developed by Duckworth et al., (2009). The 20 statements reflect three aspects of the GRIT variable: consistency of interest and persistence of effort. The measurement of learning motivation variables using 16 statement items represents eight indicators from Sardiman (2014), namely persevering in doing tasks, resilient in facing difficulties, showing interest in learning, preferring to work independently, getting bored quickly with routine and repetitive tasks, being able to defend his opinion, not easily giving up things that are believed and done and enjoying identifying and solving problems. The items developed for learning motivation are in Table 2. The measurement instrument employs a 4-point Likert scale, ranging from: 1) strongly disagree, 2) disagree, 3) agree, to 4) strongly agree.

In addition to the questionnaire for economic learning achievement, this study used a test of multiple-choice questions with five options. There were 20 economics questions designed for X-grade students in the first semester of the Merdeka Belajar curriculum. These questions aim to assess students' comprehension of scarcity, understanding of priority scales, and comprehension of economic systems. Each question was categorized as having a medium difficulty level, ensuring it was easy enough for students. It ensures that the questions have sufficient distinguishing power for evaluating students' performance. The questionnaires and tests were designed and created using the Google Forms platform, an online application allowing easy and efficient survey form creation. Once completed, the questionnaires and tests were distributed directly to respondents through barcode scanning.

Validity test for decision making based on the r-count > r-table value of 0.361. Statement items declared valid will then be used to collect data in this study, and invalid items are declared invalid or cannot be used to collect research data. A summary of the validity results is in Table 1. The results of the validity test show that all variables are

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declared statement items that are valid and meet the criteria. Thus, statement items can be used for research.

Table 1. Validity Test Result of GRIT, Learning Motivation & Learning Achievement

Variable	Number of initial items	No. Fallen Grain	Number of Drops	Number of Valid Items
GRIT	20	0	0	20
Learning Motivation	16	0	0	16
Learning Achievement	20	0	0	20

Table 2. Reliability Test Result of GRIT, Learning Motivation & Learning Achievement

Questionnaire	Cronbach's Alpha	N of Items	Reliablity
GRIT	0,838	20	Very high
Learning Motivation	0,796	16	High
Learning Achievement	0,811	20	Very high

The reliability test results in Table 2. show that the Alpha coefficient value meets the high and very high-reliability criteria. Thus, the items of each variable are suitable for use as measuring instruments in research. The research occurred in senior high schools in Purworejo Regency, Central Java. The population in this study was 2773 grade X students from 11 schools. Determine the sample size of the entire school population using the cluster random sampling; 142 students were obtained. The distribution is as follows:

Table 3. Distribution of Samples

Names of School	Sample	Gender	
		Female	Male
Public School A	46	90	52
Public School B	34		
Public School C	30		
Public School D	32		
Total	**142 students**		

The research methodology comprised distributing the questionnaires and tests, analyzing the responses, and deriving conclusions based on the results. This study analyzed the data using IBM SPSS software version 25. The data analysis process was carried out sequentially: 1) conducting a normality test, 2) conducting a linearity test, 3) conducting a multicollinearity test, 4) conducting a heteroscedasticity test, 5) conducting hypothesis testing, and 6) conducting moderation regression analysis (MRA).

Results and Discussion

Table 4. Descriptive Statistics

		Statistics		
		GRIT	Learning Motivation	Learning Achievement
N	Valid	142	142	142
	Missing	0	0	0
Mean		57.86	45.00	68.73
Median		57.50	45.00	70.00
Std. Deviation		8.639	8.787	12.652
Minimum		27	26	25
Maximum		80	64	95

Based on Table 4, it can be seen that from 142 samples, the mean value of GRIT (X1) data is 57.86, learning motivation (X2) 45.00, and Learning Achievement (Y) 68.73. The median value of GRIT (X1) data was 57.50, learning motivation (X2) 45.00, and learning achievement (Y) 70.00. The standard deviation on GRIT (X1) was 8.639, learning motivation

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(X2) 8.787, and learning achievement (Y) 12.652. The minimum value of GRIT (X1) data was 27, learning motivation (X2) was 26, and learning achievement (Y) was 25. The maximum value on GRIT (X1) was 80, learning motivation (X2) was 64, and learning achievement (Y) was 95. The collected data underwent preliminary analysis using prerequisite tests prior to the commencement of hypothesis testing. The outcomes of the prerequisite tests are detailed as follows.

Table 5. Normality Test and Linearity Test

Normality Test		Linearity Test		
N	142	Y*X1	0,488	There is a linear relationship
Sig.	0,200	Y*X2	0,123	There is a linear relationship

According to the test for normality results, the significant value 0,200 < 0.05 is declared normally distributed. Regarding the test for linearity outcomes, the Deviation from Linearity for X1 is recorded as 0.488, while for X2, it is 0.123. These values, more significant than 0.05, indicate that these regression models satisfy the test for linearity requirements.

Table 6. Multicollinearity Test

Variable	Collinearity Statistic		Description
	Tolerance	VIF	
X1	0.624	1.602	Multicollinearity does not occur
X2	0.624	1.602	Multicollinearity does not occur

The results of the test for multicollinearity revealed that the tolerance values for X1 and X2 were 0.624, while the VIFX1 and VIFX2 values were 1.602. This findings indicate that the tolerance values for X1 and X2 exceed 0.10, and the VIFX1 and VIFX2 values are below 10. Consequently, the regression model does not have multicollinearity.

Table 7. Heteroscedasticity Test

Variable	Sig.	Description
GRIT (X1)	0,413	Heteroscedasticity does not occur
Learning Motivation (X2)	0,075	Heteroscedasticity does not occur

Regarding the test for heteroscedasticity, it is observed that the significance values for X1 and X2 are 0.413 and 0.075, respectively. Since both significance probabilities exceed 0.05, it can be concluded that heteroscedasticity is not present in the regression model.

Table 8. Hypothesis Testing Result

Hypothesis	Relationship between variables Explanatory variables → Response variable			Coeff.	t	*p values*	Description
H1	GRIT	→	Learning Achievement	.267	2.864	0.005	Significant
H2	Learning Motivation	→	Learning Achievement	.288	3.092	0.002	Significant
H3	Interaction (Gender* GRIT)	→	Learning Achievement	.577	2.766	.0006	Moderate Strengthen
H4	Interaction (Gender* Learning Motivation)	→	Learning Achievement	.447	2.425	.0017	Moderate Strengthen

The t-test results were in Table 8, showed of GRIT had a positively and significantly influences on students' economic learning achievement, as shown through the t-count > t-table test results of 2.864 > 1.977 with a significance value of 0.005 < 0.05, indicating that

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the t-count was larger than the t-table, the GRIT variable influences the student economic learning achievement variable. Based on this statement, the researcher can conclude that **H1 is accepted.** Based on Table 8, the results showed that learning motivation positively and significantly influence on students' economic learning achievement as indicated by the results of the t-count > t-table test of 3.092 > 1.977 with a significance value of 0.002 <0.05, indicating the learning motivation variable influences the student economic learning achievement variable, so **H2 is accepted**. The results of the MRA test in Table 8, showed that the interaction between the GRIT variable and gender (X1*Z) obtained a t-count of 2.766 > 1.977 with a sig level of 0.006 < 0.05, indicating that gender as a moderating variable strengthens the relationship between GRIT and economic learning achievement. So, **H3 is accepted.** The interaction between the learning motivation variable and gender (X2*Z) obtained a t-count of 2.425 > 1.977 with a sig value of 0.017 < 0.05, indicating that gender as a moderating variable strengthens the relationship between learning motivation and economic learning achievement. So, **H4 is accepted.**

Table 9. Model Summary Statistics

Model	*R Square*
1	.248

From the results of the multiple determination coefficient test presented in Table 9, a coefficient of determination of 0.248 was obtained. It implies that the combined influence of the independent variables, GRIT and learning motivation, on the dependent variable of economic learning achievement amounts to 24.8%. Thus, the remaining 75.2% is attributable to other variables not examined in this study. The study's findings indicate that both GRIT and student learning motivation during learning collectively impact economic learning achievement at Purworejo Senior High School.

Discussion

GRIT influences economic learning achievement

According to the results of statistical tests, GRIT has a positive and significant impact on the economic learning achievement of class X students at Purworejo Senior High School. This result indicates that changes in students' GRIT levels will affect their learning achievement and vice versa. These findings are consistent with Duckworth et al. (2007) theory, underscoring the crucial role of GRIT in fostering students' academic success. GRIT, which includes perseverance, persistence, and passion for achieving long-term goals, can be a significant factor in helping students overcome challenges and achieve academic success. More than 100 years before Duckworth's research on GRIT, Galton (1892) had collected biographical information about prominent judges, politicians, scientists, poets, musicians, painters, wrestlers, and others, stating that ability alone does not bring success in any field. He believed high achievers were influenced threefold; "ability combined with passion and with the capacity for hard work" (Duckworth et al., 2007; A. Duckworth & Gross, 2014). According to Tough, achievement-oriented individuals work diligently, strive to complete tasks well and fulfill existing responsibilities. On the other hand, reliable individuals can self-regulate and follow commonly accepted norms (Duckworth et al., 2007).

Thus, when students demonstrate perseverance in achieving their goals, this positively affects the individual's ability to set future goals. Students with high levels of GRIT typically demonstrate patience, motivation to work hard, and perseverance in overcoming obstacles, which can ultimately improve their academic achievement (Oriol et al., 2017). This research aligns with He et al. (2021), who show that GRIT positively affects academic performance. Students with an average level of intelligence (IQ) still contribute significantly, while students with low IQ cannot improve learning achievement. Persistence and perseverance of

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effort are essential to student learning success (Martin et al., 2022). Therefore, the learning outcomes of Students who exhibit a strong dedication to academic objectives can be influenced by their level of GRIT, so their learning achievement tends to be high (Tang et al., 2021). Students with dedication and persistence achieve higher academic success, showing resilience in overcoming challenges. Focusing and determination instill confidence, while perseverance enhances academic performance and belief in success (Wolters & Hussain, 2015).

This finding shows a difference between the results of the study reported by Tannoubi et al. (2023). Despite previous research indicating that GRIT does not significantly affect learning achievement, this study's results suggest otherwise, possibly due to variations in research methods, subject samples, or study contexts. Tang et al. 's research (2021) indicated that the level of GRIT influences academic achievement in students who demonstrate a strong commitment to particular academic objectives. Students with a strong determination to achieve learning goals are better equipped to overcome obstacles, leading to higher perseverance and sustained academic efforts. Consequently, those with high GRIT and commitment tend to achieve greater learning success than peers lacking similar attributes. Therefore, perseverance and effort are crucial for student success (Martin et al., 2022). Based on theoretical review and prior research, a confirmed positive correlation exists between students' GRIT levels and academic performance. GRIT, encompassing perseverance, persistence, and long-term goal passion, is believed to impact academic success significantly. Studies indicate that students with higher GRIT levels are better equipped to surmount learning obstacles and maintain motivation, while those with lower levels struggle to stay focused, impacting their achievement. Teachers play a crucial role in fostering GRIT by offering emotional support, aiding in goal setting, and promoting active learning involvement, ultimately enhancing students' academic outcomes.

Learning motivation influences economic learning achievement

According to the results of statistical tests, learning motivation has a positive and significant impact on the economic learning achievement of class X students at Purworejo Senior High School. This result indicates that changes in students' learning motivation levels will affect their learning achievement and vice versa. The findings of this study are based on previous findings, which show a significant relationship between learning motivation and academic achievement. This finding supports the theory of Edward L. Deci and Richard M Ryan in 1985 that motivation has a vital construction that comes from within humans naturally to learn to assimilate and provide satisfaction or pleasure for themselves. It is called intrinsic motivation. Motivation that can reflect the existence of external control and has autonomous or diverse rules is referred to as self-regulation, which is the meaning of extrinsic motivation. Intrinsic and extrinsic motivation have a broad framework relevant to psychological and educational settings, namely self-determination theory. Self-determination theory has been an essential foundation for understanding motivation in various contexts, including education and learning achievement (Ryan & Deci, 2017).

This study's findings align with previous findings that show a significant relationship between learning motivation and academic achievement at the junior high school level. It is evident through good achievement in school subjects, which is affected by motivational factors (Abdurrahman & Garba, 2014). Sivrikaya's research (2019) Indicates a favorable correlation between motivation to learn and academic performance; this can be seen in the increased value of physical education and sports. Higher learning motivation correlates with better performance, while lower motivation typically results in lower achievement. High-

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motivation students tend to concentrate more in class, develop better study habits, and persist more in their efforts, leading to improved outcomes (Gupta & Mili, 2016).

Motivation is seen as one of the most dominant factors in determining the achievement of educational goals because motivation has a role in shaping students' attitudes and behaviors toward learning. When students feel motivated, they actively participate in the learning process, creating an environment conducive to understanding and achieving their goals (Nikou, 2016; Tambunan et al., 2018). Motivation also directs the student's attention toward the desired goal and increases their efforts to achieve it. When students feel motivated, they tend to be more focused and diligent in their learning, maximizing their potential to achieve academic success (Guo et al., 2023). Educators and the education system must recognize the pivotal role of motivation in attaining educational objectives. Motivating students will enhance academic performance and cultivate the essential skills and attitudes needed for success in life. Based on theoretical review and prior research, a positive correlation exists between students' learning motivation and achievement. High learning motivation is crucial for academic success, influencing students' effort, focus, and goal pursuit. Teachers play a vital role in fostering motivation by creating a positive environment and offering individual and group support. These strategies can enhance students' motivation and, consequently, their academic achievement.

Gender as a Moderating Variable Strengthen the Relationship between GRIT and Learning Motivation on Economic Learning Achievement

Based on the results of the MRA test, the gender variable can impact the GRIT variable and motivation and learning achievement, which means that there are differences in learning between male and female students in class X at Purworejo Senior High School. Thus, the gender variable as a moderator can strengthen the GRIT variable and learning motivation on economic learning achievement. The results of this study align with the research of Guo et al. (2023), which shows that GRIT affects language learning achievement. Female students outperform male students because female students tend to accept challenges when facing difficulties in language learning and associate academic achievement with increasing their intelligence. Female students outperform male students in three ways: study habits tend to indicate a higher level of adherence to learning rules and expectations, consistency of interest can lead to deeper levels of understanding and better achievement in the long run, and perseverance of effort reflects their ability to stay focused and strive despite challenges or difficulties in learning (Guo et al., 2023). In line with Martin et al. (2022), Women tend to exhibit greater perseverance in effort, whereas men typically demonstrate higher consistency of interest in achieving learning goals. This persistence of effort is evident in their diligent task completion, independent learning, and resilience in overcoming learning challenges. Conversely, males often display higher consistency of interest, suggesting fluctuations in their interest levels over time. However, when engaged, they exhibit strong dedication toward their learning objectives.

This study's findings align with research by Guo et al. (2021), indicating that male students exhibit higher levels of internal and external motivation in learning. In contrast, female students predominantly demonstrate internal motivation alone. It suggests notable differences in motivational factors between genders, highlighting implications for tailored educational strategies. The research suggests that male students tend to have higher levels of internal and external motivation in learning than female students, who primarily exhibit internal motivation. These variations in motivational factors between genders have important implications for designing effective educational strategies (Guo et al., 2023). While other studies show no significant influence of gender on learning motivation, research by Iwaniec

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(2019) and Niaz et al. (2018) indicates that gender does not directly influence learning motivation. While there are disparities in learning preferences and attitudes between male and female students, gender alone may not determine learning motivation. Instead, variables like the learning environment, personal experiences, and individual needs may significantly shape students' learning motivation. Gender is a status differentiator of human individuals' physical and psychological conditions. Male students tend to be more self-controlled or stable than female students, but their learning achievement is better than male students (Sigmundsson et al., 2021). Physical differences between men and women stem from biological variances like hormones and body structure, while psychological disparities encompass preferences, tendencies, and emotional needs. Some previous research suggests that male students may exhibit greater self-control or stability than female students. However, it is crucial to acknowledge individual diversity and the influence of factors like environment, education, and genetics on development. Avoiding over-generalizations and embracing inclusivity is essential in describing gender differences among students and fostering a supportive learning environment for all.

Conclusion

From the analysis of data and hypothesis testing conducted, the study draws the following conclusions: 1) There is a positive and significant Impact of GRIT on the economic learning achievement of students of Purworejo State Senior High School, 2) There is a positive and significant Impact of learning motivation on the economic learning achievement of students of Purworejo State Senior High School, 3) Gender as a moderating variable can strengthen the relationship between GRIT and economic learning achievement of Purworejo State Senior High School students, and 4) gender as a moderating variable can strengthen the relationship between learning motivation and economic learning achievement of Purworejo State Senior High School students. The analysis results show that GRIT and learning motivation positively and significantly influence students' economic learning achievement. It confirms the importance of non-cognitive factors such as GRIT and motivation in achieving better academic results. In addition, research shows that gender can strengthen the relationship between GRIT and learning motivation with students' economic learning achievement. The impact of GRIT and learning motivation may differ between male and female students.

Recommendation

Based on the results of the research, teachers can develop inclusive lesson plans, apply interactive learning methods and pay attention to students' learning styles in class, hold regular meetings with parents of students who have learning difficulties, create additional programs for students who need extra attention in understanding the subject matter and involve counselling teachers in assisting students who have learning difficulties. School principals can hold regular coordination meetings every semester for all teachers and school staff to check student development data regularly, such as test scores, performance evaluations and student behaviour records, in order to find out trends and patterns that appear in student learning outcomes, then the principal plans corrective actions to improve student learning outcomes. Recommendatios for future research are to add other factors that can also affect student learning achievement, such as environmental factors, social support, or emotional intelligence in this field. Thus, the results of this study provide valuable insights for educators and educational practitioners in understanding the factors that influence student learning achievement and provide direction for further research in this field.

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