

Fueling Time Mastery: How Self-Regulation Drives Time Management Through the Power of Grit in Vocational Teachers?

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Abstrack

Teachers at vocational high schools often struggle to manage their time effectively due to heavy workloads and diverse responsibilities. This study investigates the effect of self-regulation on time management, with grit as a mediating variable. Self-regulation refers to the ability to control behavior, set goals, and maintain focus, while grit reflects persistence and passion for long-term goals. Using a quantitative ex-post facto design, data were collected from 92 SMK teachers through total sampling. Three psychological scales were used: the self-regulation scale, the grit-short scale, and the time management scale. Data analysis employed descriptive statistics and mediation analysis using PROCESS Macro (Model 4) in SPSS 25. Results show that self-regulation has a positive and significant effect on time management through grit, which serves as a full mediator. This means self-regulation enhances time management only when accompanied by high levels of grit. The findings highlight the need to foster both self-regulation and grit in teacher development programs.

Keywords: grit, self-regulation, teachers, time management, vocational high schools

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INTRODUCTION

Vocational education, such as Vocational High Schools, plays a vital role in preparing a skilled workforce ready to compete in the industrial world. Vocational High Schools are designed to provide practice-based education that emphasizes technical and vocational competencies, enabling graduates to enter the workforce directly or pursue higher education (Directorate General of Vocational Education, Ministry of Education and Culture, 2020). Within this ecosystem, vocational high school teachers serve as key actors who determine the success of the educational process. They are responsible for ensuring that students possess theoretical knowledge and practical skills relevant to industrial demands (Putra & Utomo, 2022).

Unlike general education teachers, vocational high school teachers face more complex challenges. They must integrate academic content with practical experience and stay up to date with the latest industrial technology (Sutrisno, 2021). Furthermore, they must establish partnerships with industries, engage in continuous professional development, and manage administrative and academic responsibilities (Ministry of Education and Culture, 2021). These multidimensional tasks require teachers to have strong time management, self-regulation, and persistence to fulfill their roles effectively.

However, several problems have been identified in the field regarding vocational teachers' performance, particularly in managing their time efficiently. According to UNESCO (2023), one global issue in vocational education is low teacher productivity stemming from poor time-management skills. This inefficiency reduces teaching quality and weakens the transfer of practical competencies to students. The problem is evident in both developing and developed countries, making it a significant concern in global education systems.

Similar challenges are also evident in Indonesia. Data from the Ministry of Education, Culture, Research, and Technology (2022) show that around 35% of vocational high school teachers struggle to balance administrative and academic workloads. This situation is aggravated by a dense curriculum, performance reporting obligations, and various time-consuming school programs. At SMK Negeri 1 Merdeka, teachers often arrive late to class, experience disruptions in teaching, and feel overwhelmed by excessive assignments.

Teachers at Merdeka State Vocational Secondary School 1 also report fatigue and boredom from additional duties, particularly those involving technology. The implementation of the Merdeka Curriculum requires participation in the Merdeka Teaching Platform (PMM), independent training, and reporting on the Pancasila Student Profile Strengthening Project (P5). In addition, several teachers teach in more than one school to fulfill face-to-face hours (JTM) requirements due to the shortage of certified teachers. These findings illustrate the urgent need for better time management among vocational educators.

Time management involves planning, organizing, controlling, and evaluating the efficient use of time to achieve desired goals. It includes setting priorities, creating schedules, and avoiding procrastination. For teachers, effective time management allows a balance between instructional duties, administrative tasks, and personal development. Claessens et al. (2007) found that good time management increases productivity, reduces stress, and enhances performance. Likewise, Macan (1994) and Aeon & Aguinis (2017) emphasized its connection to professional satisfaction and psychological well-being.

In the vocational education context, time management skills are particularly critical due to the dual demands of theory and practice. Two psychological factors



strongly influence these skills: self-regulation and grit. Self-regulation helps individuals set goals, control emotions, and direct behaviors (Zimmerman, 2000). Meanwhile, grit promotes persistence and consistency in achieving long-term goals despite challenges (Duckworth et al., 2007). Together, they equip teachers to handle demanding workloads effectively.

Self-regulation enables teachers to consciously manage their thoughts, emotions, and actions under pressure. Teachers with strong self-regulation can plan lessons systematically, maintain focus amid distractions, and delay personal gratification for long-term success (Evertson & Weinstein, 2013; Kramarski & Kohen, 2017). This ability also allows teachers to reflect and adapt their teaching strategies according to classroom needs (Zimmerman, 2002). Thus, self-regulation forms a foundation for effective time management and continuous professional development.

Grit, on the other hand, refers to perseverance and passion for achieving long-term goals despite obstacles (Duckworth et al., 2007). Individuals with high grit remain motivated and focused even when facing difficulties (Von Culin et al., 2014). Duckworth and Quinn (2009) found grit to be a strong predictor of success in education and work, while Eskreis-Winkler et al. (2014) and Credé et al. (2017) linked grit with emotional regulation, persistence, and adaptability. In the teaching profession, grit helps educators sustain effort and enthusiasm over time.

Previous studies indicate that grit can mediate the relationship between self-regulation and time management. Ariyanti & Nugroho (2022) found that teachers with high self-regulation tend to have greater grit, which in turn improves their time-management abilities. This finding aligns with Ramadhani & Yusuf (2023) and Liu et al. (2021), who reported that grit strengthens consistency under work pressure. However, limited research specifically examines this relationship among vocational high school teachers. Therefore, this study aims to explore how self-regulation, through grit, influences time management among vocational educators, offering theoretical and practical contributions to teacher development.

METHOD

This research is a quantitative study using an ex post facto approach. The subjects in this study were teachers at Merdeka State Vocational Secondary School 1. The selection of Merdeka State Vocational Secondary School 1 as the research location was based on the presence of a phenomenon relevant to the research focus: the challenges of time management and self-regulation that teachers face in fulfilling their professional and personal roles. This phenomenon makes this school an appropriate context for exploring the relationship between the research variables in depth. The population in this study amounted to 92 teachers. Because the population is relatively small and still fully reachable, the sampling technique used is total sampling, namely, all members of the population are used as research samples. This study used three psychological scales, namely the self-regulation scale, the perseverance scale, and the time management scale. The self-regulation scale was developed by modifying Zimmerman's (2000) theory, which includes three main dimensions: goal setting, self-monitoring, and self-reflection. The validity of the scale was tested using Gregory's test, with a score of 0.940, and its reliability was 0.888. The perseverance scale was adapted from the Short Grit-S Scale developed by Duckworth and Quinn (2009), which consists of two dimensions: perseverance in effort and consistency of interest.



The validity of the scale was tested using Gregory's test, with a score of 0.900, and its reliability was 0.930. Meanwhile, the time management scale was compiled by researchers based on the time management aspects according to Atkinson (1994), which consist of several aspects, namely organizing and planning tasks, determining priority scales, efficient use of time, and time control. The validity of the scale was assessed using Gregory's test, with a score of 0.980 and a reliability of 0.870. This instrument was compiled using a 5-point Likert scale, with ratings ranging from 1 (strongly disagree) to 5 (strongly agree). The collected data were analyzed descriptively and inferentially. Descriptive analysis included calculating the mean, standard deviation, and frequency distribution for each variable using SPSS version 25. The prerequisite tests for the analysis included normality, multicollinearity, and heteroscedasticity tests. For inferential analysis, a mediation analysis was conducted using the PROCESS Macro (Hayes, 2018; version 4.2) with Model 4 to determine the effect of self-regulation on time management, with grit as the mediator.

RESULTS AND DISCUSSION

Results

The data in this study were obtained by distributing psychological scales as research instruments. The sample demographics in this study are shown in Table 1.

Table 1.

Sample Demographics by Gender		
Gender	Frequency	Percentage
Woman	51	55.4%
Man	41	44.6%
Total	92	100%

Based on Table 1, the sample with female gender numbered 51 teachers (55.4%), while the sample with male gender numbered 41 teachers (44.6%). Furthermore, demographic data by employment status are presented in Table 2.

Table 2.

Sample Demographics by Employment Status		
Employee Status	Frequency	Percentage
Civil servant	53	57.6%
PPPK	10	10.9%
Honorary	29	31.5%
Total	92	100%

Based on Table 2, it can be seen that the majority of respondents were civil servant teachers (53 people) (57.6%), followed by honorary teachers (29 people) (31.5%), and PPPK teachers (10.9%). Furthermore, the self-regulation categorization is shown in Table 3.



Table 3.
 Self-Regulation Categorization

Category	Score	Frequency	
		F	%
Very high	$X \geq 84.0$	28	30.4%
High	$68.0 \leq X < 84.0$	40	43.5%
Moderate	$52.0 \leq X < 68.0$	17	18.5%
Low	$36.0 \leq X < 52.0$	6	6.5%
Very Low	$X < 36.0$	1	1.1%
Total		92	100.0%

Based on Table 3, most teachers have high (43.5%) or very high (30.4%) levels of self-regulation. The remainder are in the moderate (18.5%), low (6.5%), and very low (1.1%) categories. Furthermore, the grit categorization is shown in Table 4.

Table 4.
 Grit Categorization

Category	Score	Frequency	
		F	%
Very high	$X \geq 33.6$	30	32.6%
High	$27.2 \leq X < 33.6$	38	41.3%
Moderate	$20.8 \leq X < 27.2$	18	19.6%
Low	$14.4 \leq X < 20.8$	5	5.4%
Very Low	$X \leq 14.4$	1	1.1%
Total		92	100.0%

Based on Table 4, the majority of teachers are in the high (41.3%) and very high (32.6%) categories for grit. Others are in the moderate (19.6%) and low (5.4%) categories, and only 1 teacher (1.1%) is in the very low category. Further categorization of time management can be seen in Table 5.

Table 5.
 Time Management Categorization

Category	Score	Frequency	
		F	%
Very high	$X \geq 105$	27	29.3%
High	$85 \leq X < 105$	39	42.4%
Moderate	$65 \leq X < 85$	19	20.7%
Low	$45 \leq X < 65$	6	6.5%
Very Low	$X \leq 45$	1	1.1%
Total		92	100.0%

Based on Table 5, the majority of teachers are in the high (42.4%) and very high (29.3%) categories. A total of 20.7% of teachers are in the moderate category, and the remainder are in the low (6.5%) and very low (1.1%) categories.

The results of the normality test using the Kolmogorov-Smirnov method show that all variables in this study, namely self-regulation, grit, and time management, have a significance value (p) greater than .05 based on unstandardized residual scores. The significance value for the normality test is 0.178 ($p > .05$), so the residual data is normally



distributed and meets the normality assumption. Furthermore, the results of the multicollinearity test indicate that there is no multicollinearity problem between the independent variables. The tolerance values for the self-regulation variable for time management and the grit variable are .972, both greater than the threshold of .10. Meanwhile, the Variance Inflation Factor (VIF) values for both variables are 1.029, which are still well below the multicollinearity tolerance limit ($VIF < 10$). Thus, it can be concluded that there is no multicollinearity in this regression model. The results of the heteroscedasticity test using the Glejser test show that the significance value of self-regulation is .227 ($p > .05$) and grit is .731 ($p > .05$). Because both significance values are above .05, it can be concluded that the regression model does not experience heteroscedasticity problems and the assumption of homoscedasticity is met. Finally, the autocorrelation test using the Durbin-Watson statistic yields a DW value of 1,928 with a sample size of 92 teachers. Based on the Durbin-Watson table at a significance level of 5% with two predictors ($k = 2$) and a sample size ($n = 92$), the dL value is 1,615 and dU is 1,690. Because the DW value is between $dU < DW < 4 - dU$ ($1,690 < 1,928 < 2,310$), there is no autocorrelation in this regression model. Next, a simple regression test is shown in Table 6.

Table 6.
Simple Regression Test

Path in the mediation process	<i>b</i>	SE	<i>t</i>	<i>p</i>	R	R ²
Path c						
Self-regulation Time Management	0.4491	0.070	6.3864	0,000	0.587	0.343
Path a						
Self-regulation Grit	0.4435	0.068	6.4819	0,000	0.592	0.350
Path b						
Grit Time Management	0.9408	0.047	19,9438	0,000	0.945	0.893

In Table 6, the results of a simple regression analysis show that self-regulation has a significant effect on time management, with a regression coefficient of 0.4491 ($t = 6.3864$, $p = 0.000$) and a contribution of 34.3% ($R^2 = 0.343$). In addition, self-regulation has a significant effect on grit ($b = 0.4435$, $t = 6.4819$, $p = 0.000$, $R^2 = 0.350$), indicating that higher self-regulation is associated with higher grit. Meanwhile, grit shows a very strong influence on time management ($b = 0.9408$, $t = 19.9438$, $p = 0.000$) with a very large contribution of 89.3% ($R^2 = 0.893$). Furthermore, the regression test of the mediation model, using Hayes' v4.2 Process Macro, is shown in Table 7.

Table 7.
Regression Test of Mediation Model

Effect	<i>b</i>	<i>p</i>	LLCI	ULCI
Indirect Effects	0.4172		0.3091	0.5891
Direct Effects	0.0319	0.1663	-0.0385	0.1023
Total Effect	0.449	0.0000	0.3091	0.5891

Table 8 presents the results of the mediation test, indicating no direct effect in the mediation model, as evidenced by the LLCI value (- 0.0385), which is below 0, with a significance of 0.1663. Furthermore, there is an indirect effect (through mediation) of



0.417. This effect is significant as indicated by the LLCI and ULCI values which are above 0 (0.3091 and 0.5891, respectively). This indicates that self-regulation influences time management through grit as a mediator, suggesting that full mediation occurs in this relationship. Further details can be seen in the figure.

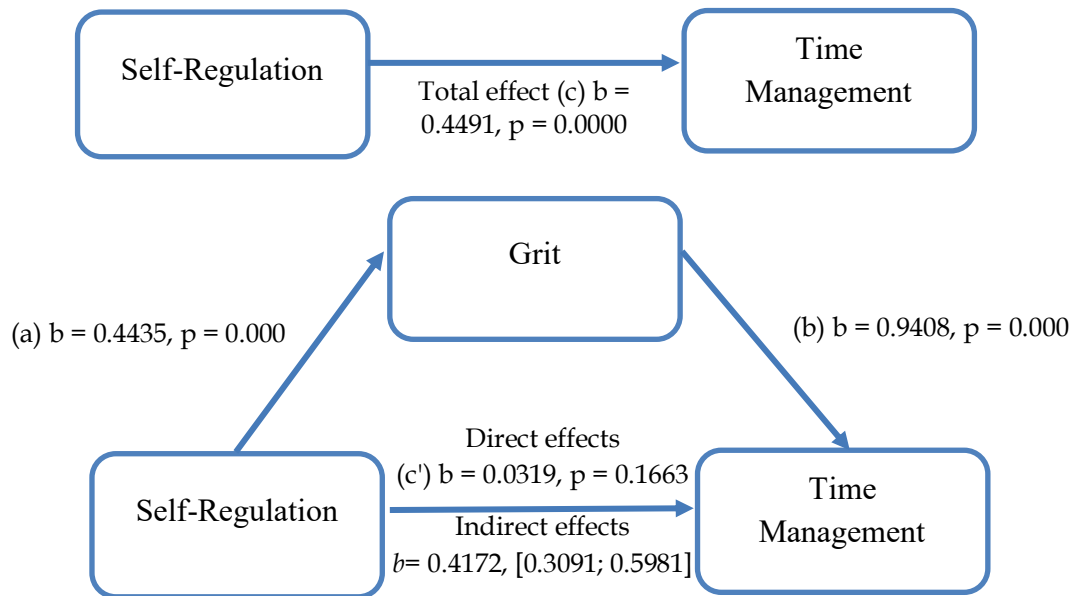


Figure 1. Grit Variable Mediation Analysis Chart

Discussion

The results of the first hypothesis test indicate a significant influence between self-regulation and grit in vocational high school teachers thus, the first hypothesis in this study is accepted. This indicates that teachers with good self-regulation skills tend to have high levels of perseverance and consistency towards goals. Vocational high school teachers who can manage emotions, control impulses, and plan and evaluate their actions effectively are more likely to resist giving up when facing challenges and to continue striving to achieve their set targets. They can maintain motivation and commitment over the long term, even under high pressure and heavy workloads. This finding is supported by research by Rachmat et al. (2021), which shows that self-regulation plays a crucial role in developing grit in educational environments.

Furthermore, a study by Syam et al. (2023) also shows that self-regulation contributes significantly to teachers' resilience and persistence in fulfilling professional responsibilities. Another study by Ayu & Fatimah (2020) found that teachers with high levels of self-regulation demonstrate persistent efforts and perseverance in carrying out their role as educators. Furthermore, findings from Nuraini and Saputra (2022) confirm that self-regulation is a strong predictor of grit development in adults, including educators. Furthermore, a recent study by Handayani and Prasetyo (2024) showed that improving self-regulation can strengthen teachers' persistence in achieving long-term educational goals, particularly in the context of post-pandemic learning.

The results of the second hypothesis test indicate a significant effect of grit on time management in vocational high school teachers, thus accepting the second hypothesis in this study. This indicates that teachers with high levels of grit, namely perseverance and consistency towards long-term goals, are able to manage their time



more effectively in carrying out their professional duties and responsibilities. Grit enables teachers to stay focused on priorities despite facing challenges and minimizes procrastination in their work. Persistent vocational high school teachers tend to develop realistic work plans and commit to predetermined schedules, thereby optimizing time efficiency. This finding aligns with research by Sari and Rachman (2021), which found that individuals with high grit are better able to prioritize their time and activities in line with their life goals.

Furthermore, a study by Yuliani and Pramudita (2023) found that grit is positively correlated with time management skills, particularly in managing long-term tasks. Research by Afifah and Suparman (2020) also shows that teachers with strong grit can adjust their work time to meet professional needs without sacrificing quality. Similar results were obtained in a study by Putri and Kurniawan (2022), which showed that grit plays a crucial role in avoiding distractions and maintaining work productivity. Finally, findings from Wulandari and Hasanah (2024) reinforce that persistence and consistency in grit are key factors in time management skills in educational work environments.

The results of the third hypothesis test indicate a significant effect of self-regulation on time management in vocational high school teachers, thus accepting the third hypothesis of this study. Teachers with strong self-regulation skills tend to be able to set clear goals, plan strategic steps, control distractions, and evaluate their time usage reflectively. Thus, they can allocate time effectively for teaching, administrative, and professional development activities, while avoiding procrastination. This is consistent with the findings of Wulandari & Hidayati (2021), who found that self-regulation is positively associated with time management skills among educators. Another study by Putri & Adisusilo (2022) confirmed that teachers with high self-regulation demonstrate better work efficiency because they can manage time and priorities effectively.

Furthermore, research by Rahayu & Nugroho (2023) found that strengthening the self-monitoring and self-evaluation aspects of self-regulation significantly impacts work-time planning and control. Fitriani and Prasetya (2020) also stated that self-regulation skills help teachers avoid time pressure and increase daily productivity. Recent research by Hasanah & Purnama (2024) strengthens these findings by showing that self-regulation is an important predictor of time management effectiveness in educational settings, particularly at the vocational high school level.

The results of the fourth hypothesis test indicate a significant influence of self-regulation on time management, with grit acting as a mediator among vocational high school teachers. In the mediation model, this study found full mediation, indicated by the disappearance of the direct effect of self-regulation on time management when the mediator (grit) was included in the model. This suggests that teachers' self-regulation and self-control do not directly influence their time management, but rather do so through grit's role as a bridge. Teachers with strong self-regulation skills, such as the ability to plan, set priorities, and control impulses and negative emotions, will more easily cultivate a persistent and consistent attitude towards long-term goals, which are key characteristics of grit (Yunita & Rahman, 2023). With grit, teachers are less likely to succumb to work pressures and demands and are more able to utilize their time strategically and productively (Wardani & Sari, 2022). In the context of the work environment in vocational schools, where complex and diverse workloads require teachers to have high adaptive capacity, the presence of grit as a result of good self-regulation plays a role as an important psychological mechanism in increasing the effectiveness of time management (Taufik et al, 2020; Putri & Lestari, 2021; Hasanah et al, 2022).



These findings align with various studies in the past five years. Putri & Lestari (2021) revealed that self-regulation indirectly influences the effectiveness of time management through grit among educators, meaning that persistence in pursuing goals acts as a bridge in this relationship. Furthermore, Wardani & Sari (2022) showed that teachers with high grit are better able to manage time because they have a clear goal orientation and a strong commitment to achieving it. Another study by Taufik et al. (2020) also supports these findings, stating that the ability to self-regulate and maintain internal motivation is closely related to how effectively an individual structures their time. Yunita & Rahman (2023) found that grit significantly mediates the relationship between cognitive functions such as self-regulation and planned behavioral output, including time management skills. Furthermore, research by Hasanah et al. (2022) concluded that in a stressful workplace, grit is a key element in maintaining time discipline and perseverance, especially for educators. Thus, these findings strengthen the argument that strengthening self-regulation in teachers is more effective when accompanied by the development of grit, because both contribute synergistically to essential time-management skills in education.

The finding that grit fully mediates the relationship between self-regulation and time management has important implications for teacher professional development, particularly in Vocational High School settings with high, complex work demands. First, these results indicate that training or interventions focused solely on improving self-regulation skills may not directly lead to improvements in time management. Approaches that also foster and strengthen aspects of grit, such as persistence in facing challenges and consistency in pursuing long-term goals, are needed. Therefore, teacher development programs should integrate self-regulation training with the development of resilience and persistence under work pressure. Second, in practice, schools and educational policymakers can use these results as a foundation for designing curricula to develop non-cognitive teacher competencies. For example, strengthening a work culture that fosters grit, such as mentoring that emphasizes the importance of long-term hard work, providing positive feedback for consistent effort, and a performance evaluation system that values the process, not just the end result, is essential. Furthermore, in the context of further research, these results open the opportunity to explore other factors that might strengthen the relationship between self-regulation and effective time management, such as social support from colleagues or transformative leadership in schools. Thus, this research not only provides a theoretical contribution in enriching the psychological mediation model in the educational context but also provides a clear direction for efforts to improve teacher professionalism in the vocational high school environment.

CONCLUSION

The research found that self-regulation significantly influences time management through grit as a mediating factor among vocational high school teachers. Teachers with strong self-management skills, including goal setting, behavioral control, and emotional regulation, tend to develop higher levels of grit, which in turn enhances their ability to manage time effectively. This highlights grit's essential role in linking self-regulation to efficient time use in a demanding, multitasking work environment. The study contributes to understanding the psychological mechanisms that support teachers' productivity, though it is limited by its cross-sectional design and reliance on self-reported data. Future studies are encouraged to adopt longitudinal or mixed-method approaches and include



variables such as work stress, organizational support, and mindfulness to gain deeper insights into this relationship.

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