THE INFLUENCE OF SELF-REGULATED LEARNING, SELF-EFFICACY, AND GRIT ON LEARNING PERFORMANCE AT HONGHE VOCATIONAL AND TECHNICAL COLLEGE, YUNNAN PROVINCE

Man Li[1], Surachai Traiwannakij*[2]

[1,2]*Management Science Department, Institute of Science Innovation and Culture*
Rajamangala University of Technology Krungthep, Bangkok, Thailand
*) corresponding author: surachai.t@mail.rmutk.ac.th

ABSTRACT In 1972, UNESCO's report "Learning to Be: The World of Education Today and Tomorrow" emphasized the importance of students becoming the focus of school education, capable of self-education and self-learning to adapt to a rapidly changing world. By the 1980s, learning performance gained attention in educational psychology and American education, highlighting learners' strategic and goal-oriented approaches. China's curriculum reform reflects this trend, with the 2014 "Curriculum Standards for Twelve-Year Basic Education," implemented in 2019, emphasizing student-centered personalized education to promote innovation and lifelong learning. This study aims to explore the impact of Self-regulated Learning, Self-efficacy, and GRIT on Learning Performance using a research framework based on a literature review and a questionnaire survey to collect and analyze data. Through various statistical analyses, this study concludes that differences in Gender, Major, Age, and Grade Level generate differences in Students' Learning Performance. Specifically, female students exhibit significantly higher Learning Performance compared to male students. Students majoring in Preschool Education have the lowest, and those in Firefighting have the highest Learning Performance. Learning performance increases significantly with age, particularly in 17-year-old students, who perform better than 15-year-old- and 16-year-olds. First-year university students have significantly lower Learning Performance than second-year and third-year students. The Multiple Linear Regression Analysis indicates that these three factors, namely, Self-regulated Learning, Self-efficacy, and GRIT, significantly impact Learning Performance.

Keywords: Self-regulated Learning, Self-Efficacy, GRIT, Learning Performance.

INTRODUCTION

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) published the report "Learning to Be: The World of Education Today and Tomorrow" in 1972, which emphasized that students should be at the center of school education. Students need to be able to educate themselves and engage in self-learning to adapt to the rapidly changing world. Therefore, how to educate students to become autonomous learners and how to cultivate students' ability to learn independently have become new topics for teachers in the 21st century. In the 1980s, self-regulated learning, or autonomous learning, began to receive attention and discussion in educational psychology and the American education sector. It emphasizes that learners are strategic and goal-oriented during the learning process (Singh, 2024). They can adjust their learning motivation, apply learning strategies, and control their learning behavior to achieve learning goals, which resonates with UNESCO's proposed 21st-century competencies.

The recent emphasis on developing students' autonomous learning abilities internationally is also

reflected in the latest curriculum reform in China. In 2014, the Ministry of Education announced the "General Outline of the National Basic Education Curriculum for Twelve Years," which officially took effect in 2019 (Republic of China year 108), commonly referred to as the "108 Curriculum" or "New Curriculum." The 108 Curriculum lists "achieving every child - promoting individual talents, lifelong learning" as its reform vision. It emphasizes student-centered learning through personalized education to stimulate students' innovation and desire to learn, making them adaptable and socially resilient lifelong learners.

To provide students with opportunities for autonomous learning within the framework of the new curriculum, the Ministry of Education has allocated a weekly "flexible learning time" of 0 to 2 periods in each term, totaling 6 to 12 periods over six terms (adjusted to a total of 4 to 12 periods after the 111 academic years). This time can be used for students' autonomous learning and other activities such as enrichment/remedial teaching, talent training, and school-specific activities. When promoting autonomous learning, schools are encouraged to establish regulations regarding flexible learning time, including implementation principles, reference formats for students' autonomous learning plans, and guidance management (Singh, 2024). Autonomous learning refers to students planning their autonomous learning plans within the school's implementation standards, including learning themes, methods, progress, content, and required resources, with guidance from teachers and agreement from parents or guardians (Ministry of Education, 2014, 2018)

Empirical studies indicate that self-regulated learning is an important factor influencing individuals' learning performance outcomes (Berkhout et al., 2015). Self-efficacy is one of the key factors in the process of self-regulated learning. That is, self-regulated learners tend to have higher self-efficacy. Self-efficacy, therefore, directly or indirectly affects learning performance. Individuals with higher self-efficacy exhibit stronger motivation and high-quality learning strategies, making them more capable of achieving challenging goals (Wanet et al., 2012). Wu and Mcllroy (2023) have consistently shown that GRIT is a significant predictor of achievement, linking it to higher GPA, retention, and graduation rates. A meta-analysis by Akos and Kretchmar (2017) further revealed that GRIT's perseverance of effort component is a more robust predictor of academic performance than the consistency of interest component. Therefore, this study investigates the influences of Self-regulated Learning, Self-efficacy, and GRIT on Learning Performance.

LITERATURE REVIEW
Theory of Self-regulated Learning

The term "Self-Regulated Learning (SRL)" has been translated differently by Chinese researchers,

such as Self-disciplined Learning, Self-regulated Learning, and Self-controlled Learning. It mainly discusses the active learning patterns of learners in terms of cognition, metacognition, behavior, and motivation. This concept originates from Bandura's Social Learning Theory, which posits that in a learner-centered learning process, individuals, under the interactive influence of cognition, environment, and behavior, use strategies to adjust their behavior, change self-efficacy, and achieve learning goals (Panadero, 2017). Wolters and Brady (2021) believe that self-regulated learning involves any learning-related cognition that can maintain and promote learning behaviors, ultimately achieving learning goals. Butler (2022) has compiled numerous theories related to Self-regulated Learning, including the Social Cognitive Theory, the Volition Theory, the Humanistic theory, and the Hierarchy of Needs. Studies also suggest significant differences in self-directed learning among students of different grade levels (Patrick & Middleton, 2002). Furthermore, Perry et al. (2002) focused on Taiwanese university students. They pointed out that higher-grade students have better self-regulated learning abilities than lower-grade students, and students' self-regulated learning abilities positively impact learning outcomes.

Theory of Self-Efficacy

Lippke (2020), based on the perspectives of behavioral and cognitive psychology, introduced the Social Learning Theory by emphasizing the human capacity for self-regulation. Building upon this theory, Schunk and DiBenedetto (2022) proposed the Social Cognitive Theory, focusing on individual beliefs and the ability to regulate one's behavior and thoughts, with individual self-adjustment at its core. He highlighted that learning is a continuous process involving interactions between oneself and the social environment. Within the social environment, individual behavior, environmental factors, and self-cognition about the environment mutually influence each other. Hence, the three factors of individual, environment, and behavior form the triadic orientation of the Social Cognitive Theory, also known as the Triadic Theory of Learning. In this Social Cognitive Theory, Bandura analyzed the sources and dimensions of self-efficacy. Céspedes et al. (2021) highlight that self-efficacy strongly predicts academic success, often surpassing other motivational constructs. Studies such as those by Zelenak (2019) and Olave (2019) further confirm that self-efficacy significantly impacts academic performance across various educational levels and contexts. Educators can enhance students' self-efficacy through structured mastery experiences, role modeling, constructive feedback, and managing emotional states. By fostering a supportive environment and celebrating incremental successes, teachers can help students build the confidence needed to achieve their academic goals, thus underscoring the importance of self-efficacy in education.

Theory of Grit

Grit, a concept popularized by psychologist Duckworth (2016), refers to a combination of passion and perseverance toward long-term goals. Despite obstacles and setbacks, this trait emphasizes sustained effort and interest over extended periods. Tiwari and Verma (2023) defined grit as distinct from, but related to, other constructs like self-control and conscientiousness. Individuals with high levels of grit are more likely to maintain their determination and motivation over the years, achieving high levels of success and mastery in any field. Empirical studies, such as those by Wu and McIlroy (2023), have consistently shown that grit is a significant predictor of achievement, linking it to higher GPA, retention, and graduation rates. A meta-analysis by Credé et al. (2017) further revealed that the perseverance of effort component of grit is a more robust predictor of academic performance than the consistency of interest component. Singh and Chukkali (2021) suggest that high achievers typically focus on specific goals for a long time without being influenced by external factors, possessing a resilient trait. He emphasizes that perseverance is more important than intelligence; effort and years of persistence lead to success. Tiwari and Verma (2023) interviewed professionals in investment banking, painting, journalism, academia, medicine, and law. They discovered that their common traits were not innate talents but rather ambitious attitudes and relentless efforts that contributed to their success.

Theory of Learning Performance

The Theory of Learning Performance emphasizes various evaluation methods to measure learning outcomes and learner progress comprehensively. Educators and trainers can better understand learners' learning conditions by integrating multiple evaluation methods, optimizing teaching strategies, and improving educational quality. These evaluation methods include the following:

Learner reaction surveys are typically conducted through questionnaires and are sometimes called "smile sheets." These surveys measure learners' immediate reactions and satisfaction with the training or educational course. By collecting subjective feedback from learners, educators can gain insights into their perceptions of the teaching content, instructional methods, and overall learning experience. One key advantage of this method is the ability to promptly identify issues in the teaching process and make swift adjustments. As described in the Kirkpatrick model, learner satisfaction is the most basic level of evaluation but is also a necessary condition for effective learning (Qureshi et al., 2021).

Knowledge tests evaluate learners' mastery of the material through formal exams or assessments. This method typically includes multiple-choice questions, true/false questions, short-answer questions, and other formats to measure learning outcomes quantitatively. The results of knowledge tests can help educators determine whether learners have achieved the expected learning objectives and identify which knowledge areas require further reinforcement. According to Bloom's Taxonomy of Educational Objectives, knowledge tests can help assess learners' abilities in remembering, understanding, and applying

cognitive skills (Talan, 2020).

METHOD

This study investigates the influence of self-regulated learning, self-efficacy, and GRIT on learning performance among technical students at Yunnan Honghe Polytechnic. Without determining the population, the representation of 400 units will be the target sample of this population under the formulae of Yamane (1967). Based on advanced statistical procedures, the data analysis of this study is divided into two categories: descriptive statistics and inferential statistics. Descriptive statistics presented in this study include the absolute frequency, the percentage frequency, the arithmetic mean, and the standard deviation. This study applied the Independent Samples t-test, One-way ANOVA, and Multiple Linear Regression Analysis for inferential statistics.

RESEARCH FINDINGS

Descriptive Statistics
Demographic Factors
Table 1: The Frequency and Percent Frequency Classified by Demographic Factor

1. Gender:	Frequency	Percent
Male	204	51
Female	196	49
2. Major:		
Preschool Education	60	15
Sports Training	164	41
Zisha Pottery	120	30
Firefighting	56	14
3. Age:		
15 years old	136	34
16 years old	164	41
17years old	100	25
4. Grade:		

1st Year of University	84	21
2nd Year of University	280	70
3rd Year of University	36	9
Total	400	100

The data provided in Table 1 suggests that gender distribution among the participants is relatively balanced, with males comprising 51% (204 individuals) and females 49% (196 individuals) of the total 400 participants. This near-equal gender split indicates a diverse sample population. Regarding major distribution, the majority of participants are enrolled in Sports Training (41%, 164 individuals), followed by Zisha Pottery (30%, 120 individuals), Preschool Education (15%, 60 individuals), and Firefighting (14%, 56 individuals). This suggests that Sports Training is the most popular major among the participants. With reference to age groups, the age distribution shows that most participants are 16 years old (41%, 164 individuals), followed by 15 years old (34%, 136 individuals), and 17 years old (25%, 100 individuals). This indicates a concentration of participants around the age of 16. In terms of grade level, a significant majority are in their 2nd year of university (70%, 280 individuals), with smaller proportions in their 1st year (21%, 84 individuals) and 3rd year (9%, 36 individuals). This suggests that the sample is predominantly composed of 2nd-year students.

Self-regulated Learning

Table 2: Descriptive Statistics of Self-regulated Learning

Classification	N	Mean	Standard	Meaning	RANK
Self-Effective	400	3.839	1.058	Agree	2
Metacognitive Strategies	400	3.835	0.960	Agree	3
Prior Knowledge	400	3.857	0.843	Agree	1
Overall	400	3.843	0.665	Agree	

It is evident from Table 2 that Prior Knowledge is the most important aspect, with a mean score of about 3.857, followed by Self-Effective and Metacognitive Strategies, with a mean score of about 3.839 and 3.835, respectively. The overall mean score is recorded as approximately 3.843, which is evaluated at the agreed level.

Self-Efficacy

Table 3: Descriptive Statistics of Self-Efficacy

Classification	N	Mean	S.D.	Meaning	RANK
Internally Directed Self-Efficacy	400	3.746	0.806	Agree	2
Empathetic Self-Recovery Ability	400	3.866	0.678	Agree	1
Overall	400	3.806	0.408	Agree	

It can be seen from Table 3 that the Empathetic Self-Recovery Ability is more important than Internally Directed Self-Efficacy since the former has a mean of about 3.866 compared to 3.746 of the latter. The overall mean score is recorded as approximately 3.806, which is evaluated at the agreed level.

1.4 GRIT

Table 4: Descriptive Statistics of GRIT

Classification	N	Mean	Standard	Meaning	RANK
Interest	400	3.856	1.003	Agree	2
Practice	400	3.610	0.757	Agree	4
Purpose	400	3.840	0.972	Agree	3
Hope	400	3.889	1.023	Agree	1
Overall	400	3.799	0.714	Agree	

From Table 4, it can be summarized that Hope is the most important aspect, with a mean score of about 3.889, followed by Interest, Purpose, and Practice, with a mean score of about 3.856, 3.840, and 3.610, respectively. The overall mean score is recorded as approximately 3.799, which is evaluated at the agreed level.

1.5 Learning Performance

Table 5: Descriptive Statistics of Learning Performance

Classification	N	Mean	Standard	Meaning	RANK
Affective Strategies	400	3.853	1.030	Agree	3
Skill Strategies	400	3.863	0.968	Agree	2
Cognitive Strategies	400	3.908	1.000	Agree	1
Overall	400	3.874	0.958	Agree	

The results from Table 5 indicate that Cognitive Strategies are the most important aspect, with a mean score of about 3.908, followed by Skill Strategies and Affective Strategies, with a mean score of about 3.863 and 3.853, respectively. The overall mean score is recorded as approximately 3.874, which is

evaluated at the agreed level.

Inferential Statistics

Differences in Demographic Factors Generate Differences in Learning Performance

Differences in Gender Generate Differences in Learning Performance

$H_0 : \mu_1 = \mu_2$
$H_a : \mu_1 \neq \mu_2$

Table 6: The Independent Samples t-test of the Gender Factor

Items	Gender	N	Mean	S.D.	t-value	p-value
Learning Performance	Male	204	3.394	0.901	23.273	.000*
	Female	196	4.374	0.735		

From Table 6, it can be seen from the Independent Samples t-test that the p-value of Learning Performance with respect to Gender is approximately .000, much lower than the critical value of 0.05. Therefore, the null hypothesis (H_0) is rejected, which implies that differences in Gender generate differences in Learning Performance.

2.1.2 Differences in Major, Age, and Grade Generate Differences in Leadership Effectiveness

$H_0 : \mu_i = \mu_j$
$H_a: \mu_i \neq \mu_j$ at last one Pair where i $\neq$ j.

Table 7: The One-Way ANOVA of Major, Age, and Grade Factors

Learning Performance		Sum of Squares	Df	Mean Square	F	Sig.
Major	Between Groups	66.968	3	22.323	29.537	.000*
	Within Groups	299.281	396	0.756		
	Total	366.25	399			
Age	Between Groups	84.628	2	42.314	59.65	0.000*
	Within Groups	281.622	397	0.709		
	Total	366.25	399			
Grade	Between Groups	43.211	2	21.605	26.552	0.000*
	Within Groups	323.039	397	0.814		
	Total	366.25	399			

It is evident from Table 7 that the p-values of Learning Performance concerning Major, Age, and Grade under the One-way ANOVA are all approximately .000, which is much lower than the critical value of 0.05. Therefore, the null hypothesis (H_0) is rejected, implying that differences in these three aspects, namely, Major, Age, and Grade, generate differences in Learning Performance.

2.2 Self-regulated Learning, Self-Efficacy, and GRIT Influence on Learning Performance

$H_0: \beta_i = 0$
$H_a: \beta_i \neq 0 \ (i=1, 2, 3)$
Multiple Linear Regression Analysis is applied to this study.
$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_{2 +} \beta_3 X_{3 +} \sum$
Where Y = Learning Performance

X_1 = Self-regulated Learning
X_2 = Self-Efficacy
X_3 = GRIT
$\sum$ = Error Term

The final results obtained from the Multiple Linear Regression Analysis are presented in terms of predicted value of Y () shown in Equation (1) and Table 8.

$$\hat{Y} = -0.254 + 0.253X_1 + 0.831X_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$
$$(0.003)\ (0.000)\ \ (0.000)$$
$$\text{Adjusted } R^2 = 0.868$$

Table 8: The Multiple Linear Regression Analysis of Self-regulated Learning and GRIT Influence on Learning Performance

Model	Coefficient			t-test	p-value
	Unstandardized Coefficients		Standardized Coefficients Beta		
	B	Std.Error			
1 Constant	-.254	.085		-2.999	.003*
Self-regulated Learning	.253	.050	.215	5.065	.000*
GRIT	.831	.048	.733	17.267	.000*

Dependent Variable：Learning Performance

It can be seen from Table 8 that GRIT, with a Standardized Beta coefficient of about .733, has the highest relative importance, suggesting that it is the strongest predictor of Learning Performance, followed by Self-regulated Learning, with Standardized Beta coefficients of about .215. The Adjust R^2 of this Multiple Linear Regression is approximately .868, meaning that one unit change of these 2 factors, namely, Self-regulated Learning and GRIT, will cause the Learning Performance change in the same direction about .868 unit.

2.2.1 Self-regulated Learning Influence on Learning Performance

$H_0: \beta_i = 0$
Ha: βi ≠ 0 (i=1, 2, 3)

Multiple Linear Regression Analysis is applied to this study.
$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_{2} + \beta_3 X_{3} + \sum$$
Where Y = Learning Performance
X_1 = Cognitive Strategies
X_2 = Meta Skill Demonstrations
X_3 = Prior Knowledge
$\sum$ = Error Term

The results obtained from the Multiple Linear Regression Analysis are presented in terms of predicted value of Y () shown in Equation (2) and Table 9.

$$\hat{Y} = -0.15 + 0.06X_1 + 0.26X_2 + 0.72X_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(2)$$
$$(0.000)\ (0.000)\ (0.000)\ (0.000)$$

Adjusted $R^2 = 0.940$

Table 9: The Multiple Linear Regression Analysis of Self-regulated Learning Influence on Learning Performance

Model	Coefficient			t-test	p-value
	Unstandardized Coefficients		Standardized Coefficients Beta		
	B	Std. Error			
1 Constant	-0.15	0.08		-1.91	0.05*
Cognitive Strategies	0.06	0.02	0.07	3.32	0.00*
Meta Skill Demonstrations	0.26	0.03	0.27	10.32	0.00*
Prior Knowledge	0.72	0.03	0.69	27.31	0.00*

Dependent Variable：Learning Performance

The results obtained from Table 9 indicate that Prior Knowledge with a Standardized Beta coefficient of about 0.69 has the highest relative importance, suggesting that it is the strongest predictor of Learning Performance, followed by Meta Skill Demonstrations and Cognitive Strategies, the Standardized Beta coefficients of which are about 0.27 and 0.07, respectively. The Adjust R^2 of this Multiple Linear Regression is approximately .940, meaning that one unit change of these 3 factors, namely, Cognitive Strategies, Meta Skill Demonstrations, and Prior Knowledge, will cause the Learning Performance to change in the same direction about .940 unit.

2.2.2 Self-Efficacy Influence on Learning Performance

H_0: $\beta_i = 0$

H_a: $\beta_i \neq 0$ (i=1, 2)

Multiple Linear Regression Analysis is applied to this study.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \sum$$

Where Y = Learning Performance

X_1 = Nternally Directed Self-Efficacy

X_2 = Empathetic Self-Recovery Ability

$\sum$ = Error Term

The results obtained from the Multiple Linear Regression Analysis are presented in terms of predicted value of Y () shown in Equation (3) and Table 10.

$$\hat{Y} = 1.07 + 0.66X_1 + 0.09X_2 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(3)$$

$$(0.000) \quad (0.000) \quad (0.000)$$

Adjusted $R^2 = 0.627$

Table 10: The Multiple Linear Regression Analysis of Self-Efficacy Influence on Learning Performance

Model	Coefficient			t-test	p-value
	Unstandardized Coefficients		Standardized Coefficients Beta		
	B	Std. Error			
1 Constant	1.07	0.23		4.72	0.00*

Internally Directed Self-Efficacy	0.66	0.04	0.62	15.64	0.00*
Empathetic Self-Recovery Ability	0.09	0.05	0.08	1.94	0.05*

Dependent Variable：Learning Performance

It is evident from Table 10 that Internally Directed Self-Efficacy, with a Standardized Beta coefficient of about 0.62, has the highest relative importance, suggesting that it is the strongest predictor of Learning Performance, followed by Empathetic Self-Recovery Ability with the Standardized Beta coefficients of about 0.08. The Adjust R^2 of this Multiple Linear Regression is approximately .627, meaning that one unit change of these 2 factors, namely, Internally Directed Self-Efficacy and Empathetic Self-Recovery Ability, will cause the Learning Performance change in the same direction about .627 unit.

2.2.3 GRIT Influence on Learning Performance

H_0: $\beta_i = 0$
H_a: $\beta_i \neq 0$ (i=1, 2, 3, 4)
Multiple Linear Regression Analysis is applied to this study.
$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \Sigma$$
Where Y = Learning Performance
X_1 = Interest
X_2 = Practice
X_3 = Purpose
X_4 = Hope
Σ = Error Term
The results obtained from the Multiple Linear Regression Analysis are presented in terms of predicted value of Y () shown in equation (4) and Table 11.
$$\hat{Y} = 0.027 + 0.054X_1 + 0.085X_2 + 0.243X_3 + 0.617X_4 \ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$
(0.662) (0.002) (0.008) (0.000) (0.000)
Adjusted $R^2 = 0.961$

Table 11: The Multiple Linear Regression Analysis of Grit Influence on Learning Performance

Model		Coefficient		t-test	p-value
		Unstandardized Coefficients	Standardized Coefficients Beta		
		B	Std.Error			
1 Constant	0.027	0.062		0.438	0.662
Interest	0.054	0.017	0.056	3.192	0.002*
Practice	0.085	0.032	0.077	2.686	0.008*
Purpose	0.243	0.028	0.250	8.786	0.000*
Hope	0.617	0.023	0.651	26.878	0.000*

Dependent Variable：Learning Performance

The results obtained from Table 11 indicate that Hope, with a Standardized Beta coefficient of about 0.651, has the highest relative importance, suggesting that it is the strongest predictor of Learning

Performance, followed by Purpose, Practice, and Interest, the Standardized Beta coefficients of which are about 0.250, 0.077, and 0.056, respectively. The Adjust R^2 of this Multiple Linear Regression is approximately .961, meaning that one unit change of these 4 factors, namely, Interest, Practice, Purpose, and Hope, will cause the Learning Performance to change in the same direction about .961 unit.

CONCLUSION AND DISCUSSION

The study results indicate significant gender differences in Learning Performance, with female students demonstrating higher effectiveness than male students. This finding aligns with previous research suggesting that female students often exhibit better self-regulation and application of learning strategies (Voyer & Voyer, 2014). Such differences could be attributed to varying socialization patterns and educational experiences encouraging girls to develop strong organizational and self-management skills. Educational institutions should consider these gender differences when designing learning performance programs, potentially incorporating targeted interventions to support male students in developing these essential skills. The One-way ANOVA results reveal that Learning Performance varies significantly across different majors. Students majoring in Preschool Education show the lowest effectiveness, while those in Firefighting have the highest. This variation may reflect the distinct nature of different academic disciplines, with some requiring more hands-on, practical experiences that foster autonomous Knowledge Tests (Ardura & Galan, 2019). The findings suggest that curriculum designers should tailor educational approaches to different fields' specific demands and learning styles. For instance, majors with lower Learning Performance might benefit from additional resources, such as workshops on self-regulation strategies or enhanced academic advising.

The multiple linear regression analysis underscores a significant positive relationship between self-regulated learning (SRL) and Learning Performance, indicating that higher SRL capabilities markedly enhance students' Learning Performance. This finding is consistent with existing literature that identifies SRL as a critical factor in effective learning (Wang, 's 2020). SRL involves a cyclic process where learners set goals, monitor their progress, and adjust their learning strategies accordingly, which naturally aligns with the demands of learning performance environments. Given the high t-value and a p-value of zero, the robustness of this relationship is statistically incontrovertible, emphasizing the necessity for educational institutions to foster SRL skills.

Educational institutions and organizations should prioritize the development of SRL skills as a foundational component of their curricula and training programs. Techniques such as goal-setting workshops, reflective journals, and peer feedback sessions can effectively enhance SRL skills. Additionally, integrating technology, such as learning management systems that provide real-time feedback and

personalized learning paths, can further support SRL development (Broadbent et al., 2021). For instance, goal-setting workshops can guide students on how to set SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals, which can significantly improve their ability to plan and monitor their learning activities.

The significant influence of self-efficacy on Learning Performance, demonstrated by the regression analysis, echoes foundational and contemporary research within educational psychology. Self-efficacy, a concept central to Bandura's social cognitive theory, is a key determinant of motivation and behavior, affecting individuals' ability to face challenges, exert effort, and persist in adversity (Flannagan, 2008). This theory posits that individuals with high self-efficacy are more inclined to engage in tasks they perceive as achievable, invest the necessary effort, and persist longer, thereby enhancing their learning effectiveness.

Moreover, academic studies have continued to explore this dynamic, consistently finding that self-efficacy significantly predicts successful learning outcomes across diverse settings. For instance, Ding and Zhu (2021) highlight the strong correlation between self-efficacy and academic achievement, noting that learners with higher self-efficacy are more likely to embrace and overcome learning challenges. Similarly, Honarzad and Rassaei (2019) explore how self-efficacy influences academic motivation, engagement, and performance, underscoring the vital role of self-belief in educational success.

The relationship between grit and learning effectiveness aligns with Angela Duckworth's research, which posits that grit is a stronger predictor of success than talent or intelligence (Yoon et al., 2020). Grit enhances individuals' capacity to maintain effort and interest despite failure, adversity, and plateaus in progress. This persistence is crucial in learning performance contexts, where learners face challenges without immediate external support.

Further, studies within the field of educational psychology highlight grit's role in academic achievement and self-regulated learning. For instance, Chi (2023) found that grittier students were more likely to graduate from high school, indicating the importance of perseverance in achieving long-term educational goals. Similarly, Yeh et al. (2023) explored how grit correlates with self-regulated learning strategies, suggesting that grit may facilitate the engagement and effectiveness of self-directed learning activities.

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