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The causal relationship between academic burnout and emotional regulation affecting undergraduate students' learning performance in the faculty of technical education, Rajamangala university of technology Thanyaburi, Thailand

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Abstract

This research aims to develop the causal relationship model between academic burnout and emotional regulation affecting undergraduate students' learning performance in the Faculty of Technical Education at Rajamangala University of Technology Thanyaburi, Thailand, and to examine the consistency of the developed model with empirical data. The study sampled 260 undergraduate students using stratified sampling. The instruments used were the academic burnout and emotional regulation questionnaires, and the model was developed using Structural Equation Modeling (SEM) and path analysis with the AMOS software. The results of the model analysis indicate that the developed model is consistent with empirical data, with $\chi^2 = 0.12$, $\chi^2/df = 1.20$, TLI = 0.99, CFI = 0.99, AGFI = 0.93, RMSEA = 0.017, SRMR = 0.018, and RMR = 0.006. According to the path analysis results, it was found that 1) academic burnout has a significant negative direct effect on learning performance. 2) Academic burnout has a significant negative direct effect on emotional regulation. 3) Emotional regulation has a significant positive direct effect on learning performance. And 4) academic burnout has a significant negative indirect effect on learning performance through emotional regulation. In conclusion, the results of this study extend the understanding of the causal relationship between academic burnout and emotional regulation on learning performance by demonstrating that academic burnout has a negative effect on learning performance, while emotional regulation reduces the effects of academic burnout and significantly improves learning performance. The findings of this study can be utilized to develop activities or programs aimed at enhancing emotional control and fostering motivation among university students to sustainably prevent academic burnout.

Keywords: Academic burnout, Emotional regulation, Learning performance, Structural Equation Modeling.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
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1. Introduction

Burnout is a condition characterized by emotional, mental, and physical weariness resulting from prolonged stress accumulation. This phenomenon arises when an individual perceives an inability to manage their workload efficiently, leading to diminished motivation, adverse attitudes towards oneself, others, and their surroundings, as well as a feeling of incapacity to attain their objectives. The World Health Organization (WHO) categorizes burnout into three primary components: 1) feelings of energy depletion or exhaustion; 2) increased mental distance from one's job, or feelings of negativism or cynicism related to one's job; and 3) reduced professional efficacy [1]. In the fields of education, especially at the tertiary level, the prevailing learning environment is increasingly competitive and demanding. Students encounter expectations from their families, educational institutions, and themselves regarding academic success, career planning, and personal growth. This strain can result in chronic stress, a major contributor to academic burnout.

Academic burnout is a psychological condition caused by chronic stress related to learning. It reflects emotional exhaustion, detachment from studies, and a sense of low self-worth as a learner [2]. The three key components of academic burnout are 1) emotional exhaustion, which arises from the pressure of academic burdens. 2) Negative attitudes or cynicism towards studies, reflecting boredom or disinterest in the role of being a student, and 3) reduced academic efficacy, which is a negative self-assessment of one's inability to learn or achieve academic success [2, 3]. The research by Liu et al. [4] and Cheraghian et al. [5] confirms that academic burnout significantly negatively impacts students' mental health, including depression, anxiety, and stress, as well as their ability to concentrate and academic performance. Additionally, this condition is a major cause of decreased motivation to study, leading to feelings of laziness and ultimately reduced academic efficiency [2, 6]. If not managed effectively, it will not only affect the students themselves but also impact the overall learning experience and educational environment.

According to a survey on the mental health impact during the COVID-19 pandemic in Thailand, it was found that 70% of Thai students aged 15-24 experience stress and anxiety related to their studies. Among students, 29.29% reported high levels of stress, and 16.67% reported experiencing burnout in their studies [7]. This aligns with the research conducted by Abraham et al. [8] performed a meta-analysis on academic burnout among university students during the COVID-19 pandemic. They found that 56.3 percent of students experienced emotional exhaustion, 55.3 percent exhibited cynicism, and 41.8 percent perceived a decline in their skills and personal accomplishments due to online learning, resulting in challenges in studying and diminished social interaction.

Emotional regulation is related to academic burnout and learning performance. It is considered an important internal factor that helps students effectively face and manage academic pressure. Properly perceiving, understanding, and managing emotions helps reduce the severity of burnout and promotes motivation to learn [9, 10]. According to Gross [11] framework, the level of academic burnout among students may depend on the strategies used in emotional regulation to manage stress. When emotions are well-regulated, it inevitably leads to better academic performance. Seibert et al. [12] found that reappraisal and suppression influence reducing burnout in learning and improved learning performance. This is consistent with the research by Iuga and David [13] which presents a meta-analysis that examines the correlation between Emotional Regulation (ER) techniques and Academic Burnout in youth. Research indicates that effective emotion regulation strategies are negatively correlated with burnout scores, but challenges in emotion regulation are positively correlated with aspects of burnout, including emotional tiredness, detachment, and feelings of ineffectiveness. Furthermore, variables such as age, educational level, and the percentage of female participants in the sample contribute to elucidating this association. The study's findings demonstrate that ER significantly contributes to fostering academic achievement and mitigating emotional challenges such as burnout. Consequently, additional studies must be undertaken with a more precise emphasis on context and uniform measurement techniques in the future.

A review of the literature indicates that numerous studies predominantly investigate the correlational relationships between academic burnout, emotional regulation, and learning performance in a bivariate context, focusing on individual relationships, such as that between academic burnout and learning performance or between emotional regulation and academic burnout, without exploring the structural interconnections of all variables within a causal relationship model. From this gap, the research question arises as to how well the causal relationship model between academic burnout and emotional regulation explains undergraduate students' learning performance.

The development of a causal relationship model in this research is therefore necessary to explain the mechanism that shows how academic burnout may indirectly affect learning performance through emotional regulation. Specifically, if students experience high levels of burnout, it may lead to a lack of emotional control, resulting in decreased academic performance. Examining hypotheses in a causal structure manner can answer questions more clearly than correlational research or general regression analysis.

The objective of this research is to develop and examine the consistency of a causal relationship model between academic burnout and emotional regulation affecting undergraduate students' learning performance in the Faculty of Technical Education, Rajamangala University of Technology Thanyaburi. The research findings will reveal factors related to academic burnout and emotional regulation that impact learning performance, which can be used to improve, develop, and prevent issues arising from academic burnout, thereby enhancing the quality of life and academic achievement of students. Additionally, this study is significant both academically and practically, as it aims to create an understanding of the internal mechanisms affecting academic achievement and serves as a foundation for developing approaches to promote mental well-being and learning among higher education students.

2. Literature Review and Hypotheses Development

2.1. Academic burnout and Learning performance

Academic burnout comprises three elements: 1) Emotional exhaustion, defined by an absence of feelings towards academic pursuits, a decline in motivation to study, and acts as a marker of stress resulting from intense studying. It can manifest in any individual and differs among people. 2) Cynicism, characterized by negative sentiments towards learning, pessimistic perceptions of others, and lower self-esteem. 3) Reduced academic efficacy, which refers to the conviction that one is incapable of attaining the anticipated achievement in their academic pursuits [2, 3, 14]. Presently, this is the challenge that many students are encountering. The issue of burnout in students can arise when pressure, tension, and the necessity of taking responsibility for learning are combined with expectations from both oneself and others [15]. When this issue is not effectively addressed, it results in diminished learning performance, feelings of lethargy, and motivation to study [2, 6].

$H_{1:}$ Academic burnout has a negative direct effect on learning performance.

2.2. Academic burnout and Emotional Regulation

Emotional regulation is an important process that helps people deal with their feelings in the right way, whether that means changing bad feelings or accepting feelings that can't be changed. Berking et al. [16] came up with the Adaptive Coping with Emotions Model (ACE) in 2014. It was later turned into the Affect Regulation Training (ART) program. People think it is a useful guide that outlines the abilities needed to deal with emotions. This understanding has led to the development of training programs for therapy and mental health promotion in various contexts. ACE and ART define that appropriate emotion regulation consists of 9 key skills [10, 17, 18] which include 1) Awareness 2) Clarification 3) Sensation 4) Understanding 5) Compassionate Self-support 6) Modification 7) Acceptance 8) Tolerance and 9) Readiness to confront. These nine components comprehensively indicate emotional regulation skills in every aspect. Academic burnout is a factor that negatively affects emotional regulation skills because it leads to a decrease in emotional resources and mental energy [19, 20]. Causing students to lack the ability to perceive and manage their emotions appropriately, which affects the quality of learning and academic achievement [12, 13].

$H_{2:}$ Academic burnout has a negative direct effect on emotional regulation.

2.3. Academic Burnout, Emotional Regulation and Learning Performance

The ability to control emotions well is considered highly relevant to achieving success in work or study, Morrish et al. [21]. Seibert et al. [12] studied university students regarding two aspects of emotion regulation: cognitive reappraisal and emotional suppression in the context of academic burnout, which affects academic performance. This study discovered that emotional regulation could improve academic performance and avoid becoming burned out at school. Nadeem et al. [22] discovered that students who are adept at controlling their emotions, especially when it comes to cognitive reappraisal, perform better in school. Research on high school students also indicated that emotional regulation could help with academic fatigue, as well as anxiety and depression [23].

$H_{3:}$ Emotional regulation has a positive direct effect on learning performance.

Iuga and David [13] meta-analysis suggests that individuals who are severely burned out experience greater difficulty in emotional regulation during the learning process than those who are not burned out. The utilization of adaptive emotion regulation strategies is linked to a reduction in academic burnout. This implies that it is imperative to regulate emotions to prevent students from developing academic burnout, which in turn enhances learning performance. Conversely, exerting excessive effort to regulate one's emotions may exacerbate the difficulty of doing so, thereby increasing the likelihood of burnout.

$H_{4:}$ Academic burnout has a negative indirect effect on learning performance through emotional regulation.

$H_{5:}$ The causal relationship model between academic burnout and emotional regulation affecting undergraduate students' learning performance in the Faculty of Technical Education, Rajamangala University of Technology Thanyaburi. is consistent with empirical data.

The literature review summarizes the conceptual framework as shown in Figure 1.

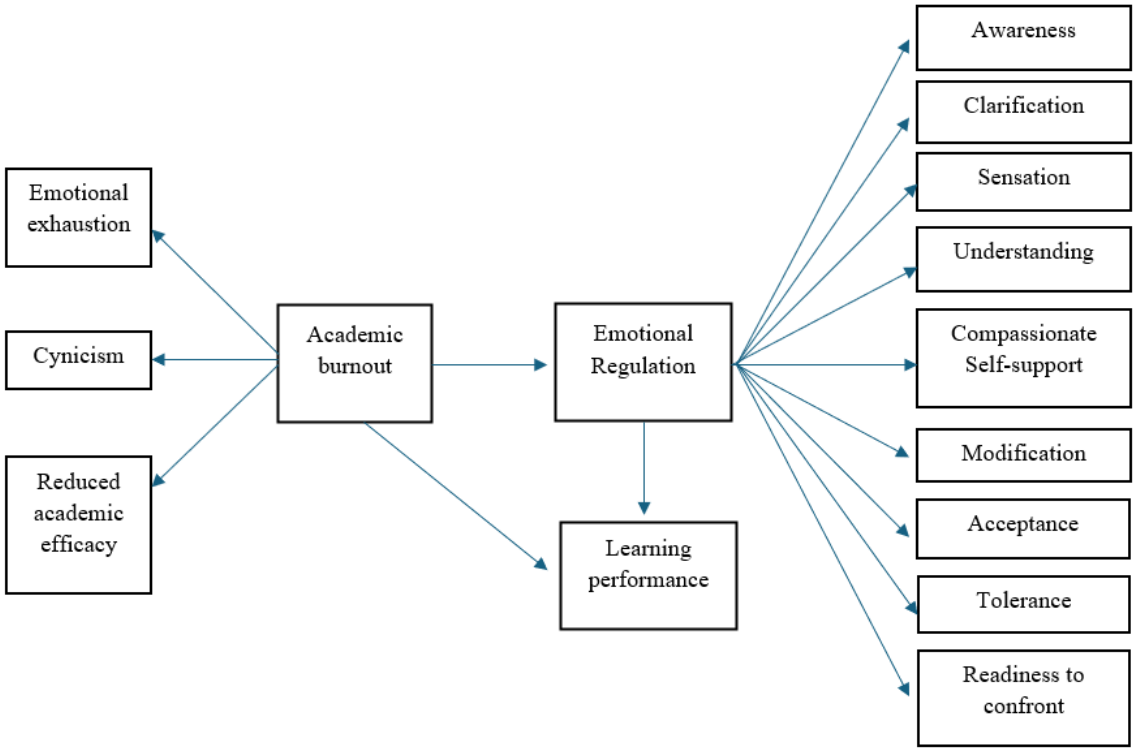

Figure 1.
Conceptual framework.

3. Materials and Methods

3.1. Population and sample

Undergraduates aged 18-24 from the Faculty of Technical Education at Rajamangala University of Technology Thanyaburi, Thailand, were selected by stratified sampling based on the distribution of their academic disciplines. Hair et al. [24] recommended a sample size for structural equation modeling (SEM) is between 150 and 450 individuals, or 10 to 20 times the number of observable variables, which is deemed adequate. This study has 13 observable variables. The requisite sample size should hence be between 130 and 260 individuals. This research utilized a sample size of 260 individuals, deemed appropriately adequate for the analysis of the SEM.

3.2. Instruments

1. The academic burnout questionnaire consists of 3 components: 1) Emotional exhaustion, 2) Cynicism, and 3) Reduced academic efficacy. The questionnaire consists of two parts: Part 1: Personal information, 4 items; and Part 2: Burnout questions, 5-point Likert scale (0 to 4), 26 items. Cronbach's Alpha Reliability = 0.98. Content validity index: CVI = 0.92.

2. Emotional regulation skills questionnaire, consisting of 9 emotional management skills: 1) Awareness 2) Clarification) 3) Sensation) 4) Understanding 5) Compassionate Self-support 6) Modification 7) Acceptance 8) Tolerance, and 9) Readiness to confront. The questionnaire consists of 2 parts: Part 1, personal information, 4 items, and Part 2, emotion regulation questions, 5-point Likert scale (0 to 4), 27 items. Cronbach's alpha reliability = 0.97. Content validity index: CVI = 0.98.

3. The measurement of Learning performance used the latest GPA data.

3.3. Data collection and analysis

The researcher submitted a letter to the Faculty of Technical Education at Rajamangala University of Technology Thanyaburi, requesting assistance in the collection of research data. Subsequently, they collaborated with faculty members from various departments to request their assistance in promoting the research project to undergraduates in those departments. The researcher provided an explanation of the research project's objectives and requested that students who voluntarily participated in the project complete a signed consent form. Next, they created an online questionnaire using Google Forms. A total of 260 completed questionnaires were returned by the students, who cooperated exceptionally well. We verified the data for accuracy and then implemented descriptive statistics to conduct preliminary data analysis. We developed a causal relationship model using Structural Equation Modeling (SEM) with the AMOS software for path analysis according to the steps of Hair et al. [24] as follows: 1) Model specification and model identification methods to ensure that the model has sufficient data for parameter estimation and can be analyzed using SEM techniques. 2) Model estimation using the maximum likelihood estimation (ML) method, which is a technique commonly used in AMOS to calculate path coefficients in the model. 3) Model fit evaluation according to the model fit index evaluation criteria. 4) Model modification and model interpretation will be conducted, considering direct effects, indirect effects, and total effects, as well as the R^2 value of the dependent variable, to interpret the causal relationships between the variables under the obtained model.

3.4. Ethical Consideration

This research was approved by the Human Research Ethics Committee of Rajamangala University of Technology Thanyaburi on December 2, 2024, under the protocol RMUTT_REC No. Exp 91/67.

4. Result

4.1. Demographic Characteristics and Normality

The study of the sample group, including 260 individuals, revealed that there were 133 men (51.15%) and 127 women (48.85%). The age range was 18 to 24 years, and the individuals were enrolled in an undergraduate program, spanning years one to four.

Table 1.
Assessment of normality.

Variable	Min.	Max.	Skewness	Kurtosis
Learning performance	2.340	3.710	0.226	-0.108
Readiness	2.000	4.000	-0.103	0.211
Tolerance	2.000	4.000	0.015	-0.031
Acceptance	2.000	4.000	-0.023	0.101
Modification	2.000	4.000	0.001	-0.034
Compassion	2.000	4.000	-0.052	0.047
Understanding	2.000	4.000	-0.018	0.244
Sensation	2.000	4.000	-0.025	0.203
Clarification	2.000	4.000	-0.089	0.180
Awareness	2.000	4.000	-0.074	0.034
Emotional exhaustion	0.000	4.000	0.046	-0.174
Cynicism	0.000	4.000	0.175	-0.013
Reduced Academic efficacy	0.000	4.000	0.127	-0.179

Table 1 presents an assessment of univariate normality of the data, considering skewness and kurtosis, which aligns with Kline's [25] assertion that skewness must fall between ±3 and kurtosis within ±10. The analysis revealed that skewness ranged from -0.218 to 0.226 and kurtosis ranged from -0.572 to 0.804, suggesting that the data for each variable approximated a normal distribution.

4.2. Measurement Model

Table 2.
Measurement Model Results.

Latent variable	Observed Variable	Loading	R^2	CR	AVE
Academic burnout	Emotional exhaustion	0.88**	0.78	0.95	0.86
	Cynicism	0.95**	0.91		
	Reduced academic efficacy	0.95**	0.91		
Emotional regulation	Awareness	0.89**	0.79	0.97	0.83
	Clarification	0.91**	0.83		
	Sensation	0.89**	0.79		
	Understanding	0.92**	0.84		
	Compassion	0.91**	0.84		
	Modification	0.91**	0.82		
	Acceptance	0.92**	0.85		
	Tolerance	0.92**	0.85		
	Readiness	0.91**	0.82		
	Learning performance (GPA)		0.35		

Note: **=P < 0.01

Table 2 presents measurement results; the standardized factor loadings of the latent variables, academic burnout, range from 0.88 to 0.95, and emotional regulation ranges from 0.89 to 0.92, which are higher than the threshold set at 0.50. Composite reliability (CR) for academic burnout and emotional regulation is 0.95 and 0.97, respectively, which are higher than the standard threshold of 0.70. Average variance extracted (AVE) values for academic burnout and emotional regulation are 0.86 and 0.83, respectively, which are higher than the standard threshold of 0.50. learning performance (GPA), which is an observed variable, has a squared multiple correlation (R^2) value of 0.35. The analysis results indicate that the measurement model has good quality in terms of reliability and structural validity, making it suitable for further use in structural equation modeling (SEM) [24].

4.3. Measure of the model fit

Table 3.
Measure of The Model Fit Results.

Model Fit Index	Acceptable Threshold	Model fit	
		Obtained Value	Result
Chi-Square (χ^2)	P > 0.05	0.12	Good Fit
Relative Chi-Square (χ^2/df)	< 2.00	1.20	Good Fit
Tucker-Lewis Index (TLI)	≥0.95	0.99	Excellent Fit
Comparative Fit Index (CFI)	≥0.90	0.99	Excellent Fit
Adjusted Goodness of Fit Index (AGFI)	≥ 0.90	0.93	Good Fit
Root Mean Square Error of Approximation (RMSEA)	<0.08	0.017	Excellent Fit
Standardized Root Mean Square Residual (SRMR)	<0.08	0.018	Excellent Fit
Root Mean Square Residual (RMR)	<0.08	0.006	Excellent Fit

Table 3 presents the results of the model fit indices are considered based on various statistics as follows: Chi-Square statistic: $\chi^2 = 0.12$ with a p-value greater than 0.05, Relative Chi-Square (χ^2/df) =1.20, TLI=0.99, CFI=0.99, AGFI=0.93, RMSEA=0.017, SRMR=0.018, and RMR=0.006. All the above indices meet the specified standards, indicating that the structural equation model is very well aligned with the empirical data. These results were obtained through the model modification (MI) process by allowing the error values of the Clarification and Acceptance variables to be related to Learning Performance [25].

4.4. Path analysis

Table 4.
Path Analysis Results.

Variable	Emotional regulation			Learning performance		
	DE	IE	TE	DE	IE	TE
Academic burnout	-0.77**	-	-0.77**	-0.43**	-0.14**	-0.58**
Emotional regulation	-	-	-	0.18*	-	0.18*
R^2	0.59			0.35		

Note: DE: Direct effect, IE: Indirect effect, TE: Total effect, **=P < .01, *=P < .05

Table 4 presents path analysis of the influence between variables in the structural equation model found that Academic burnout has a significant positive direct effect on Emotional regulation ($\beta = -0.77$, $p < 0.01$), $R^2 = 0.59$. Academic burnout has a significant negative direct effect on Learning performance ($\beta = -0.43$, $p < 0.01$) and a significant negative indirect effect through Emotional regulation ($\beta = -0.14$, $p < 0.01$). This results in a total effect of -0.58, indicating that academic burnout significantly reduces Learning performance both directly and indirectly ($\beta = -0.58$, $p < 0.01$). Additionally, the variable Emotional regulation has a significant positive direct effect on Learning performance ($\beta = 0.18$, $p < 0.05$). The Learning performance has an R^2 value of 0.35, indicating that 35% of the variance was explained by the predictor constructs' moderate level, Structural Equation Modeling as shown in Figure 2.

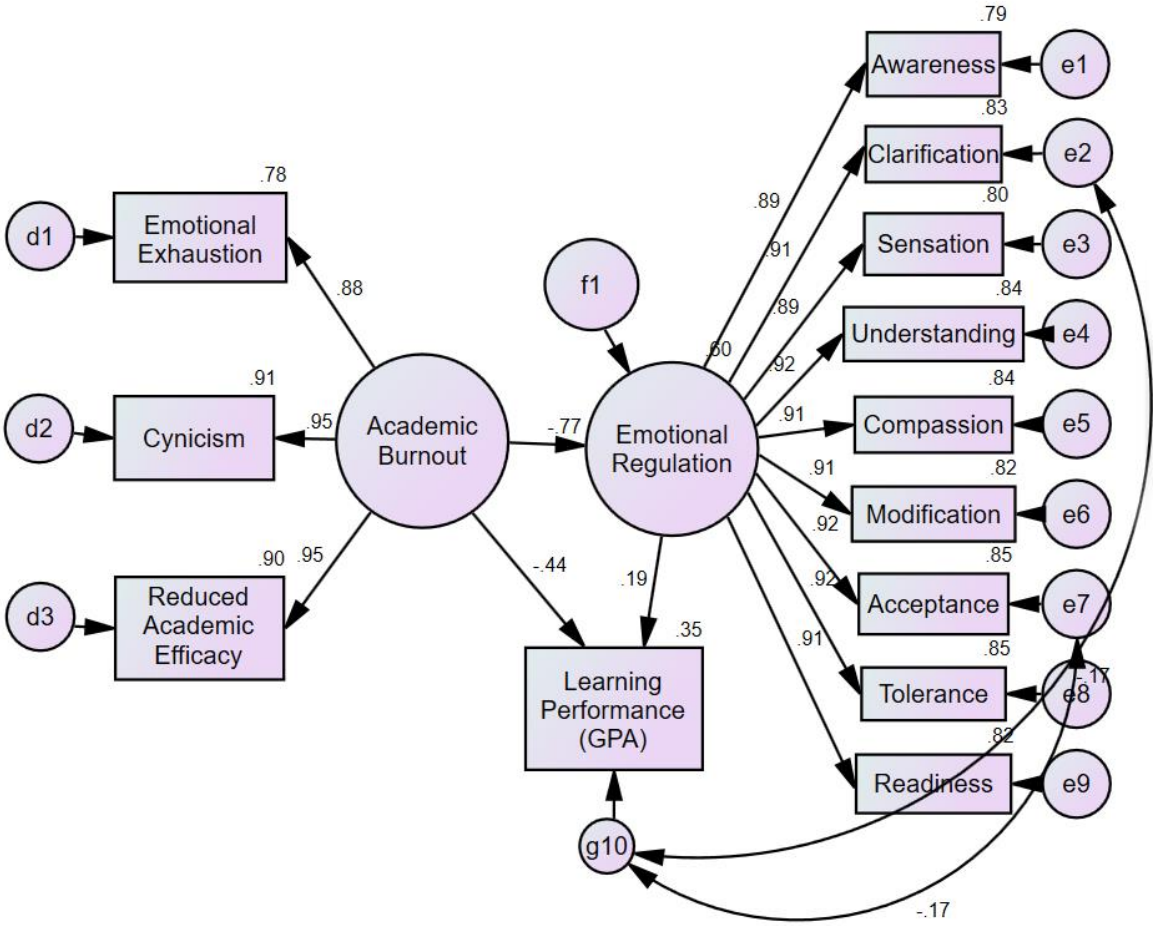

Figure 2.
Results of Structural Equation Modeling.

5. Discussion

This research aimed to develop and examine the causal relationship model between academic burnout and emotion regulation affecting the learning performance of undergraduate students in the Faculty of Industrial Education at Rajamangala University of Technology Thanyaburi, Thailand. Results of the causal relationship between academic burnout and emotional regulation affecting undergraduate students' learning performance were examined. The model consisted of various indices such as χ^2/df, TLI, CFI, AGFI, RMSEA, and SRMR. The model fit was adjusted according to standard criteria [24]. Good consistency with empirical data supports hypothesis 5 (H5). Path analysis: Find that Academic burnout has a negative direct effect on learning performance, supporting hypothesis 1 (H1). This conclusion is consistent with the concepts of Schaufeli et al. [2] and Maslach and Leiter [3], who explained that students who experience burnout have decreased energy in learning, decreased self-esteem, and decreased motivation in learning, resulting in significantly lower academic achievement. This result is also consistent with the studies of Liu et al. [4] and Lyndon et al. [6], who found that academic burnout is a risk factor for unsuccessful academic studies, affecting students' mental health and learning ability. Zhou and Wang [26] similarly, study the impact of three emotions enjoyment, boredom, and burnout on academic achievement, and examine the moderating role of academic buoyancy. The findings indicated that English-as-a-foreign-language (EFL) students with high levels of burnout reported significantly lower academic achievement, highlighting the importance of fostering positive emotions and resilience in students to enhance their academic performance.

Result findings: Academic burnout has a negative direct effect on emotion regulation, supporting Hypothesis 2 (H2). This is consistent with the study by Iuga and David [13], which found that people with high levels of burnout have lower emotion regulation abilities compared to the general population. And consistent with the study of Seibert et al. [12] noted that individuals with elevated burnout levels show diminished use of reappraisal and a higher tendency to suppress emotions, which impairs well-being and undermines their ability to cope with academic challenges effectively. Findings indicated that emotional regulation strategies preceded the effects of school burnout. School burnout, in turn, was identified as the mechanism linking (mediating) emotional regulation strategies to academic outcomes.

Additionally, it was found that emotional regulation has a positive direct effect on learning performance, supporting Hypothesis 3 (H3). This is consistent with the studies of Gross [11] and the research of Berking and Lukas [10] which concluded that individuals who can appropriately regulate their emotions can effectively face academic stress and challenges and consistently with research by Zafar et al. [27] studies the impact of emotional regulation techniques on academic performance at the secondary level. The study's findings indicate that students who have excellent emotional regulation techniques improve their academic performance. Furthermore, it demonstrated that training in emotion regulation techniques

significantly enhances the academic performance of secondary school students, suggesting that emotional regulation is a modifiable variable with practical implications.

The research findings also revealed that academic burnout has a negative indirect effect on learning performance through emotional regulation, supporting Hypothesis 4 (H4). This is consistent with the studies of Seibert et al. [12] and Nadeem et al. [22], which confirm that the use of emotion regulation strategies plays a crucial role in reducing burnout in learning, thereby affecting academic success. This aligns with Iuga and David [13], who discovered that students experiencing elevated burnout are more inclined to employ maladaptive emotional regulation mechanisms (e.g., repression, self-blame), exacerbating psychological distress and impeding academic performance. Conversely, adaptive methods such as reappraisal are associated with reduced burnout and enhanced performance. The results underscore emotional regulation as a crucial mediating factor, indicating that enhancing students' emotional coping abilities may mitigate the adverse academic effects of burnout.

6. Conclusion

In conclusion, the results of this study extend the understanding of the causal relationship between academic burnout and emotional regulation on learning performance by demonstrating that academic burnout has a negative effect on learning performance, while emotional regulation reduces the effects of academic burnout and significantly improves learning performance. The findings of this study can be utilized to develop activities or programs aimed at enhancing emotional control and fostering motivation among university students to sustainably prevent academic burnout. Moreover, the results affirm the importance of psychological resilience and emotional regulation skills as protective factors in learning performance. These findings align with previous literature suggesting that students with better emotional regulation are more likely to maintain academic engagement and avoid the detrimental effects of stress and overload. Therefore, university administrators and educators should consider integrating emotional intelligence training, stress management workshops, and peer support systems into student development programs. Additionally, this study highlights the potential for preventive interventions that focus not only on reducing academic burnout but also on strengthening students' internal coping mechanisms. By embedding these practices into the academic system, institutions can contribute to students' long-term well-being and academic success.

7. Suggestions for Future Research

Suggestions for future research include considering additional intervening or control variables such as personality traits, social support, intrinsic motivation, or cognitive function, which may influence the relationship between burnout, emotion regulation, and academic achievement. Alternatively, a mixed methods research approach should be employed to study in-depth the inner experiences of students with burnout or emotional regulation strategies. Interviews or qualitative data should be used in conjunction with quantitative data to deepen understanding. Further development into experimental research would be advantageous, such as creating new training programs focused on emotional regulation for students and teachers, aimed at enhancing their emotional control and thereby reducing burnout in educational settings.

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