

Academic burnout, fear of failure, and academic grit as predictors of academic life satisfaction among pre-service mathematics teachers



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ABSTRACT

In the increasingly demanding landscape of teacher education, pre-service teachers face not only intellectual challenges but also emotional and psychological stressors that affect their overall academic experience. This study investigates the interplay of academic burnout, fear of failure, and academic grit in predicting academic life satisfaction among pre-service mathematics teachers. Employing a descriptive-correlational design, the study involved 128 pre-service mathematics teachers. Data were analyzed using descriptive statistics, Pearson's r correlation, and hierarchical regression. The results indicate that while participants reported moderate levels of burnout and fear of failure, they demonstrated high levels of academic grit and academic life satisfaction. Academic grit showed a moderate positive correlation with satisfaction and emerged as its sole significant predictor. Interestingly, fear of failure demonstrated a weak but positive association with satisfaction, while burnout showed no significant relationship. These findings highlight grit as a key psychological resource that supports well-being in high-pressure academic environments and have implications for developing grit-building practices in mathematics teacher education.

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1. Introduction

Higher education in developing countries is increasingly challenged by intensified academic demands, constrained resources, and rising concerns about student mental health, persistence, and retention. In the Philippines, these issues are compounded by persistent underperformance in international assessments such as the Program for International Student Assessment (PISA), where Filipino students remain below global averages in mathematics, science, and reading (OECD, 2023). This underperformance highlights structural weaknesses in basic education and raises concerns about the preparedness, resilience, and well-being of future teachers, particularly in demanding fields such as mathematics. For pre-service mathematics teachers, the pressures of rigorous training, performance expectations, and limited psychosocial support may undermine both learning and

professional development. Examining their academic experiences is therefore critical to strengthening teacher education and sustaining educational quality.

A key issue is academic burnout, a multidimensional syndrome involving emotional exhaustion, cynicism or depersonalization, and reduced personal efficacy (Pham Thi and Duong, 2024). Originally tied to workplaces, burnout now pervades education amid relentless deadlines, evaluations, and expectations. Recent work situates student burnout within broader contexts, including parental pressure, overload, poor teacher-student relations, and negative peer dynamics (Jan and Parveen, 2024). For pre-service mathematics teachers, the subject's cognitive demands and performance-based training heighten vulnerability, disrupting focus and identity formation.

Equally critical is fear of failure, defined as apprehension over unmet expectations and their repercussions, beyond mere test anxiety to encompass shame, self-worth erosion, future uncertainty, and others' reactions. Conroy et al. (2002) outlined five dimensions: fear of shame and self-devaluation, uncertain future, loss of others' interest, and upsetting important others. In teacher education, this arises from past setbacks, high self-expectations, and evaluative training, fostering

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defensive pessimism, avoidance, and disengagement, especially in performance-driven environments. Educational climate modulates it: controlling practices amplify fear, while autonomy-supportive approaches mitigate it and promote adaptive coping (Giel et al., 2020). These patterns are vital for how future teachers handle academic and professional challenges.

Counterbalancing these risks is academic grit, characterized by sustained passion and perseverance for long-term goals amid setbacks (Duckworth et al., 2007). Unlike general grit, academic grit focuses on persistence in academic tasks, helping students maintain effort, commitment, and direction despite frustration or delays. In mathematics education, with its taxing content and evaluations, grit acts as a buffer, enabling endurance without erasing stressors and preserving engagement. These factors converge on academic life satisfaction, students' subjective evaluation of their academic experiences, including emotional engagement, competence, and fulfillment. Far from mere comfort, it shapes program persistence, professional commitment, and teaching readiness. Satisfied students stay motivated and invested; dissatisfied ones falter under pressure. Nevertheless, its links to burnout, fear of failure, and grit remain underexplored.

Despite growing research on teacher well-being, gaps persist: studies often isolate burnout, fear of failure, or grit, or target general students rather than subject-specific programs like mathematics teacher training. The combined effects on academic life satisfaction are poorly understood, especially in the Philippine context amid pedagogical and disciplinary demands. This study fills that void by examining academic burnout, fear of failure, academic grit, and their interplay with academic life satisfaction among Philippine pre-service mathematics teachers. Specifically, this study aims to: (1) determine the levels of academic burnout, fear of failure, academic grit, and academic life satisfaction among pre-service mathematics teachers; (2) examine the relationships among these variables; and (3) identify significant predictors of academic life satisfaction.

2. Literature review

2.1. Theoretical framework

Self-Determination Theory (SDT; Ryan and Deci, 2000) provides the theoretical foundation for this study by proposing that academic well-being arises from the satisfaction or frustration of three basic psychological needs: autonomy, competence, and relatedness (Vansteenkiste and Ryan, 2013). Each predictor maps onto a distinct SDT mechanism. Academic burnout, characterized by exhaustion, cynicism, and reduced academic efficacy (Schaufeli et al., 2002), represents need frustration, in which competence and relatedness are actively eroded. Fear of failure, organized around shame avoidance and negative failure appraisals (Conroy, 2001),

operates through introjected regulation: motivation driven by external contingencies rather than genuine self-endorsement, constraining autonomous engagement. Academic grit, understood as perseverance and passion for long-term goals (Duckworth et al., 2007), reflects identified and integrated regulation: internalized academic commitment that continuously regenerates competence and autonomy experiences conducive to satisfaction.

2.2. Academic burnout in teacher education

Academic burnout is recognized as a significant threat in teacher education, arising where sustained academic pressure intersects with the emotional demands of professional formation. Among pre-service teachers, it commonly manifests as emotional exhaustion, cynicism toward coursework, and diminished academic efficacy following prolonged exposure to workload and performance demands (Qin et al., 2022). These outcomes are educationally significant: burnout weakens attentional capacity, degrades academic achievement, and elevates dropout risk (Madigan and Curran, 2021).

Social and institutional factors modulate its trajectory; perceived stress and relational difficulty increase vulnerability, while social support and a positive professional self-concept offer protection (Jan and Parveen, 2024). Early-onset burnout during teacher preparation is particularly concerning because it may foreshadow later occupational burnout, with implications for instructional quality and professional retention (Ferreira et al., 2025). For pre-service mathematics teachers, the abstract and technically demanding nature of the discipline may amplify these risks.

2.3. Fear of failure in academic contexts

Fear of failure occupies a central place in academic psychology because students routinely interpret educational tasks as judgments of competence, worth, and future trajectory. Rather than simple performance anxiety, the construct encompasses multidimensional concerns about shame, self-devaluation, uncertain futures, and the reactions of significant others (Conroy et al., 2002; De Castella et al., 2013). In academic settings, these fears encourage avoidance goals, procrastination, and self-protective strategies, particularly in evaluative or controlling environments (Giel et al., 2020), and can undermine academic confidence and satisfaction while elevating emotional distress (Duru et al., 2024).

The construct is not uniformly harmful: under certain motivational conditions, failure apprehension sharpens effort and supports goal-directed behavior, particularly where academic success carries strong personal or social significance (Boileau et al., 2026). Fear of failure thus functions as a double-edged construct whose effects are

contingent on how students regulate and interpret academic pressure.

2.4. Academic grit as a protective factor

Academic grit is increasingly recognized as a protective resource in demanding educational environments, reflecting students' capacity to sustain effort and commitment despite setbacks. Defined as perseverance and passion for long-term goals, it is associated with persistence, resilience, academic achievement, and well-being across university contexts (Duckworth et al., 2007). Domain-specific approaches suggest that academic grit offers greater explanatory precision in educational settings, predicting satisfaction and performance more reliably than general grit (Clark and Malecki, 2019). Its effects operate through mechanisms including self-efficacy, achievement goals, engagement, and self-regulated learning (Alhadabi and Karpinski, 2020), with perseverance of effort consistently emerging as the more robust component (Jiang et al., 2019). Grit also buffers academic stress under conditions of heightened demand, enabling students to remain committed where disengagement is otherwise likely (Li et al., 2024; Meng et al., 2025). Critically, grit does not eliminate stressors; rather, it sustains emotional steadiness within them.

2.5. Academic life satisfaction and its psychological predictors

Academic life satisfaction refers to students' positive evaluation of their academic experiences, adjustment to university life, and perceived educational quality. Research consistently links higher satisfaction to stronger engagement, greater self-efficacy, improved performance, and lower stress (Antaramian, 2017; Feraco et al., 2023). It is reinforced by course engagement, adaptability, curiosity, extracurricular participation, and relational support (Feraco et al., 2023). Burnout, performance stress, and intolerance of uncertainty, by contrast, erode satisfaction alongside broader well-being (Franzen et al., 2021), while academic satisfaction itself contributes to overall subjective well-being (Zalazar-Jaime et al., 2022). In teacher education, this outcome is particularly salient because satisfaction with academic life bears on professional identity formation and long-term readiness for teaching practice.

3. Methodology

3.1. Research design

This study adopted a descriptive-correlational research design, which is well-suited for examining the relationships among multiple variables without experimental manipulation (Creswell, 2014). It aims to describe the levels of academic burnout, fear of

failure, academic grit, and academic life satisfaction among pre-service mathematics teachers and to explore how these variables are interrelated. Furthermore, the design identifies significant predictors of academic life satisfaction while drawing practical implications for mathematics teaching and learning. This approach enables the study to generate data-driven insights grounded in naturally occurring educational contexts.

3.2. Participants

The participants comprised 128 pre-service mathematics teachers from Nueva Ecija University of Science and Technology (NEUST), recruited through purposive sampling. The study included students enrolled in the Bachelor of Secondary Education major in Mathematics program during the academic year 2024–2025 in order to represent the breadth of academic and psychological experiences characterizing this group.

To qualify for inclusion, participants had to meet three conditions: (1) they were formally enrolled in the program, (2) they had finished at least one year of coursework in both professional education and major mathematics subjects, and (3) they were actively engaged in academic activities at the time of data gathering. These requirements established the sample's suitability for examining academic burnout, fear of failure, academic grit, and life satisfaction. Participants were drawn from multiple year levels to reflect experiences across different stages of the pre-service preparation period.

3.3. Research instrument

The study employed the Academic Burnout Scale developed by Jan and Parveen (2024) to measure academic burnout. This scale comprises 29 items divided into six dimensions: Parental/Guardian Pressure, Subjective Overload, Negative Teacher–Student Relation, Exhaustion, Academic Inefficacy, and Negative Peer Relation. Respondents rated each item on a 5-point Likert scale ranging from 1 (Never) to 5 (Always).

A sample item includes: “My Parents always criticize me for my studies.” The instrument underwent expert review for content validation and convergent validity using Average Variance Extracted (AVE), with values ranging from 0.46 to 0.57, indicating relevance and clarity. For constructs with AVEs of 0.4 to 0.5, composite reliability is greater than 0.6. Thus, convergent validity is established. Regarding internal consistency, the scale reported Cronbach's alphas of 0.79–0.85, indicating good reliability in assessing academic burnout among university students.

Fear of failure was assessed using the Performance Failure Appraisal Inventory (PFAI) developed by Henry et al. (2021). The inventory contains 15 items measuring Fear of an Uncertain Future, Fear of Important Others' Losing Interest, Fear of Upsetting Important Others, and Fear of

Experiencing Shame and/or Embarrassment. Participants responded on a 5-point Likert scale from 1 (I believe this is never true of me) to 5 (I believe this is true of me all of the time). A representative item is: *"When I am failing, my future seems uncertain."* Using exploratory and confirmatory factor analysis and cognitive interviews, they re-validated the PFAI, and the results indicate that a modified 15-item four-factor structure is more appropriate for assessing levels of FF in STEM students.

Academic grit was measured using the Academic Grit Scale by Clark and Malecki (2019), comprising 10 items assessing determination, resilience, and focus. The scale uses a 5-point Likert format, ranging from 1 (not at all like me) to 5 (very much like me). An example item is: *"I push myself to do my personal best in school."* The findings provide evidence of the construct validity of the AGS relative to the currently predominant grit measure, Perseverance of Effort and Consistency of Interest. In terms of reliability, the scale has demonstrated robust internal consistency (Cronbach's alpha = 0.92).

Lastly, academic life satisfaction was assessed using the Academic Life Satisfaction Scale (ALSS) developed by Schmitt et al. (2008). This 5-item scale evaluates students' subjective academic well-being and satisfaction, with responses on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A sample item includes: *"All in all, I am satisfied with the education I can get in this school."* Using autoregressive and latent growth curve modeling shows their relationships to other constructs. This study confirmed its internal reliability with a Cronbach's alpha of 0.81, reflecting consistency in capturing students' academic life satisfaction.

3.4. Validity and reliability of the instrument

Table 1 presents the Content Validity Index (CVI) and Cronbach's alpha values for each instrument. As the instruments were previously developed and validated in non-Philippine settings, content validation was conducted to examine the linguistic and cultural appropriateness of the item wording for the local context rather than to reestablish construct validity. Using the Lawshe (1975) method, six mathematics education experts evaluated all items for relevance and clarity. All four instruments yielded a CVI of 1.00, indicating unanimous agreement. This likely reflects both the established face validity of the instruments and the experts' familiarity with the constructs in the Philippine teacher education context, supporting their contextual suitability for pre-service mathematics teachers.

Following recommendations for minimum pilot study sizes in instrument reliability testing (Johanson and Brooks, 2010), the sample of 25 participants was considered sufficient as a preliminary indicator. The obtained coefficients ($\alpha = 0.83$ – 0.89) should be interpreted as preliminary

internal consistency indicators rather than definitive psychometric benchmarks, given the borderline sample size. Nonetheless, their convergence with reliability estimates from the instruments' original validation studies provides corroborative support for proceeding with the main study. Future adaptations within Philippine teacher education contexts are encouraged to employ larger pilot samples to permit more rigorous psychometric evaluation.

3.5. Data collection procedure

Data collection followed three phases to ensure ethical compliance and procedural integrity. Approval was secured from the Dean and the Department Chair, after which the researcher coordinated with subject teachers to schedule the in-class administration. Prior to participation, students were given a brief orientation to the study's objectives, the voluntary nature of their involvement, and assurances of confidentiality. The survey took approximately 10–15 minutes to complete, thus minimizing disruption to instructional time. All responses were anonymized and securely stored for analysis.

3.6. Data analysis

Mean and standard deviation were computed to describe levels of academic burnout, fear of failure, academic grit, and academic life satisfaction, and the results were interpreted using verbal descriptors. Pearson's r was used to examine the strength and direction of the relationships among the variables. Prior to regression analysis, assumptions were tested. Tolerance values (0.62–0.81) and VIF values (1.23–1.61) indicated no multicollinearity; the Durbin-Watson statistic of 1.94 supported independence of errors, and the Shapiro-Wilk test showed that residuals were approximately normally distributed ($W = 0.987$, $p = 0.214$). The residual plot likewise supported linearity and homoscedasticity. A post hoc power analysis using G*Power indicated that the sample of 128 participants achieved a statistical power of 0.98 at $\alpha = 0.05$ for the observed effect size ($f^2 = 0.213$), exceeding the recommended minimum of 0.80. Given these conditions, hierarchical linear regression was employed as an exploratory procedure to identify the most salient predictors of academic life satisfaction in a population for which multivariable evidence remains limited. Statistical significance was set at $p < 0.05$.

4. Results

4.1. Level of academic burnout, fear of failure, academic grit, and academic satisfaction of pre-service mathematics teachers

Table 2 presents a descriptive analysis of pre-service mathematics teachers' psychological and

motivational attributes. The overall mean score for academic burnout was 2.71 (SD = 0.48), indicating moderate levels of academic burnout. Among its dimensions, subjective overload ($M = 3.50$, $SD = 0.71$) had the highest rated mean, indicating that most pre-service teachers were academically overwhelmed. Exhaustion ($M = 3.29$, $SD = 0.74$) and academic inefficacy ($M = 2.95$, $SD = 0.57$) were also reported at moderate levels, suggesting fatigue

resulting from academic demands and reflecting some doubt among students about their academic capabilities. In contrast, parental or guardian pressure ($M = 2.08$, $SD = 0.76$), negative teacher-student relationships ($M = 2.20$, $SD = 0.65$), and negative peer relations ($M = 2.44$, $SD = 0.89$) were all rated low. These results suggest that interpersonal sources of stress were not major contributors to academic burnout among the participants.

Table 1: Validity and reliability of the instrument

Scale	Content validity index (CVI)	Verbal description	Cronbach's alpha	Verbal description
Academic burnout scale	1.00	Valid	0.83	Good
Performance failure appraisal inventory	1.00	Valid	0.81	Good
Academic grit scale	1.00	Valid	0.89	Good
Academic life satisfaction scale	1.00	Valid	0.87	Good

Table 2: Level of academic burnout, fear of failure, academic grit, and academic satisfaction

Variables	Mean	SD	Verbal description
Academic burnout			
Parental/guardian pressure	2.08	0.76	Low
Subjective overload	3.50	0.71	High
Negative teacher-student relation	2.20	0.65	Low
Exhaustion	3.29	0.74	Moderate
Academic inefficacy	2.95	0.57	Moderate
Negative peer relation	2.44	0.89	Low
Overall academic burnout	2.71	0.48	Moderate
Fear of failure			
Fear of an uncertain future	3.61	1.01	High
Fear of important others' losing interest	3.11	1.13	Moderate
Fear of upsetting important others	3.01	1.15	Moderate
Fear of experiencing shame and/or embarrassment	3.47	1.16	High
Overall fear of failure	3.29	0.99	Moderate
Academic grit	4.17	0.78	High
Academic life satisfaction	4.39	0.57	Very high

Very high: 4.21 – 5.00; High: 3.41 – 4.20; Moderate: 2.61 – 3.40; Low: 1.81 – 2.60; Very low: 1.00–1.80

The analysis of the fear of failure among pre-service mathematics teachers revealed an overall moderate level ($M = 3.29$, $SD = 0.99$). Among the four subscales, the fear of an uncertain future ranked highest, with a mean of 3.61 ($SD = 1.01$), suggesting that many students experience anxiety about the long-term implications of academic setbacks. This was closely followed by the fear of experiencing shame and/or embarrassment ($M = 3.47$, $SD = 1.16$), also categorized as high, reflecting concerns about the social visibility of failure and its impact on personal dignity. In contrast, the fear of important others' losing interest ($M = 3.11$, $SD = 1.13$) and the fear of upsetting important others ($M = 3.01$, $SD = 1.15$) were rated as moderate. These results suggest that while interpersonal concerns remain present, they are not as dominant as internalized or future-oriented anxieties in shaping students' fear-of-failure profiles.

The descriptive analysis indicated that pre-service mathematics teachers demonstrated high academic grit, with a mean score of 4.17 and a standard deviation of 0.78. This result reflects the sample's strong perseverance and sustained effort toward long-term academic goals.

Finally, academic life satisfaction yielded a high mean score of 4.39 ($SD = 0.57$), with consistent responses across all items. Students expressed satisfaction with their education's relevance to future employment and their teachers' competence, indicating a generally positive academic experience.

4.2. Correlation of academic burnout, fear of failure, and academic grit, to academic satisfaction

Table 3 presents the correlational analysis examining the relationships among academic burnout, fear of failure, academic grit, and academic life satisfaction using Pearson's r . The analysis revealed that overall academic burnout was not significantly related to academic satisfaction ($r = 0.012$, $p = 0.916$). All sub-dimensions, including parental/guardian pressure, subjective overload, negative teacher-student relation, exhaustion, academic inefficacy, and negative peer relation, yielded very weak, non-significant correlations.

Meanwhile, components of fear of failure demonstrated some meaningful associations. Notably, fear of an uncertain future was significantly positively correlated with academic satisfaction ($r = 0.256$, $p = 0.027$), while fear of experiencing shame or embarrassment also exhibited a positive relationship ($r = 0.363$, $p = 0.001$). The overall fear of failure construct was also significantly correlated with academic satisfaction ($r = 0.235$, $p = 0.043$). This suggests that students who fear failure, particularly when tied to social consequences, also report slightly higher academic satisfaction.

The most notable association was between academic grit and academic satisfaction ($r = 0.420$, $p < 0.001$), indicating a significant, moderate, positive relationship.

This suggests that students who demonstrate greater persistence, determination, and long-term academic focus tend to evaluate their academic experiences more positively.

4.3. Predictors of academic life satisfaction

Table 4 presents the results of the hierarchical multiple regression analysis examining academic burnout, fear of failure, and academic grit as sequential predictors of academic life satisfaction.

In Step 1, academic burnout was non-significant ($F = 0.011$, $p = 0.916$, $R^2 = 0.000$). Step 2 introduced fear of failure, producing a marginally non-significant model ($F = 2.439$, $p = 0.094$, $R^2 = 0.063$). However, fear of failure was individually significant ($\beta = 0.276$, $p = 0.031$). In Step 3, academic grit entered the model, which became significant ($F = 5.432$, $p = 0.002$, $R^2 = 0.187$). Academic grit was the sole significant predictor ($\beta = 0.379$, $p = 0.002$), reducing fear of failure and burnout to non-significance. Academic grit uniquely explained 18.7% of the variance in academic life satisfaction.

Table 3: Intercorrelation of academic burnout, fear of failure, academic grit, and academic satisfaction

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1													
2	0.141	1												
3	0.437**	0.419**	1											
4	-0.009	0.624**	0.443**	1										
5	0.161	0.401**	0.406**	0.259*	1									
6	0.252*	0.284*	0.646**	0.415**	0.165	1								
7	0.562**	0.708**	0.843**	0.671**	0.536**	0.669**	1							
8	0.062	0.393**	0.241*	0.307**	0.191	0.234*	0.347**	1						
9	0.257*	0.284*	0.377**	0.136	0.200	0.250*	0.382**	0.604**	1					
10	0.277*	0.299**	0.371**	0.252*	0.126	0.296**	0.417**	0.658**	0.829**	1				
11	0.123	0.280*	0.248*	0.227	0.149	0.254*	0.316**	0.808**	0.747**	0.768**	1			
12	0.208	0.349**	0.353**	0.246*	0.192	0.287*	0.410**	0.843**	0.912**	0.906**	0.916**	1		
13	-0.222	0.257*	-0.070	0.150	-0.173	0.015	-0.014	0.464**	0.170	0.208	0.426**	0.339**	1	
14	-0.101	0.127	-0.131	0.202	-0.064	0.037	0.012	0.256*	0.109	0.166	0.363**	0.235*	0.420**	1

1. Parental pressure; 2. Subjective overload; 3. Negative teacher–student relation; 4. Exhaustion; 5. Academic inefficacy; 6. Negative peer relations; 7. Academic burnout; 8. Uncertain future; 9. Losing interest; 10. Upsetting important others; 11. Embarrassment; 12. Fear of failure; 13. Academic grit; 14. Academic satisfaction; *: $p < 0.05$; **: $p < 0.01$

Table 4: Predictors of academic life satisfaction

Predictor	B	SE	Beta (β)	t	Sig.	R^2	ΔR^2	F	p
Step 1									
Academic burnout	0.015	0.141	0.012	0.105	0.916	0.000	0.000	0.011	0.916
Step 2									
Academic burnout	-0.121	0.150	-0.101	-0.806	0.423	0.063	0.063	2.439	0.094
Fear of failure	0.160	0.072	0.276	2.206	0.031				
Step 3									
Academic burnout	-0.037	0.143	-0.031	-0.261	0.795	0.187	0.124	5.432	0.002
Fear of failure	0.069	0.073	0.119	0.937	0.352				
Academic grit	0.279	0.085	0.379	3.280	0.002				

5. Discussion

5.1. Level of academic burnout, fear of failure, academic grit, and academic satisfaction of pre-service mathematics teachers

The moderate burnout levels observed, with subjective overload as the dominant dimension, align with research indicating that academic workload and performance pressure are the primary drivers of student burnout. That interpersonal stressors ranked low corroborates evidence emphasizing internal demands and individual coping capacity as the more consequential determinants of burnout trajectories. The associated risks for this cohort are non-trivial: burnout degrades academic engagement, achievement, and professional retention, and early-onset burnout during teacher preparation may foreshadow occupational burnout in practice (Ferreira et al., 2025; Madigan and Curran, 2021). Proactive responses, load regulation, mentoring, and structured stress management are therefore warranted to protect both student well-being and long-term professional commitment.

The moderate fear of failure profile, anchored by concerns about future uncertainty and shame, indicates that pre-service mathematics teachers are more preoccupied with internalized and forward-

looking failure consequences than with disappointing significant others. This pattern is consistent with findings linking pre-service teacher fear of failure to low confidence and anxious professional identity formation (Lutovac, 2019). While such fears frequently lead to avoidance and diminished self-efficacy, they can also serve as motivational catalysts when addressed through reflective practice and learning environments that frame failure as an inherent feature of professional growth.

High academic grit in this sample reflects the cohort's perseverance and commitment to long-term teaching goals, capacities central to navigating sustained demands in mathematics teacher preparation. Grit develops most effectively when supported by mentoring, autonomy-supportive instruction, and targeted reflective teaching training (Pasco, 2026; Wellberg, 2025). Combined with robust content knowledge and institutional support, it contributes meaningfully to both academic achievement and long-term professional readiness.

Very high academic life satisfaction, largely attributed to perceived curricular relevance and faculty competence, suggests that structural and instructional quality factors significantly affect student well-being. Satisfaction reinforces motivation, reduces stress, and contributes to

holistic academic thriving (Antaramian, 2017; Zalazar-Jaime et al., 2022), underscoring the value of sustained institutional investment in pedagogical quality and program relevance.

5.2. Correlation of academic burnout, fear of failure, and academic grit with academic satisfaction

Embarrassment and fear of an uncertain future correlated positively with academic satisfaction. This finding sits in tension with SDT, which frames fear-based motivation as introjected regulation linked to need frustration and diminished well-being (Ryan and Deci, 2000). A cultural moderation hypothesis offers one reconciliation: in collectivist contexts where academic performance carries familial meaning, shame-related failure fears may activate rather than thwart the need for relatedness. Introjected and identified regulation may thus function as complementary rather than opposing processes, consistent with calls for cultural calibration of SDT's regulatory continuum. Whether cultural orientation or self-efficacy moderates this fear-satisfaction pathway warrants direct empirical testing.

Grit's moderate association with satisfaction ($r = 0.420$, $p < 0.001$) is relatively less unexpected. Students who remain persistent and focused on their goals tend to evaluate their academic lives more positively. This pattern is consistent with findings reported by Clark and Malecki (2019), who linked grit to broader systems of support and available resources. Grit has also been found to mediate the effects of encouragement and hope on satisfaction (Okur et al., 2025). Thus, grit may be viewed not simply as a stable personal characteristic but as a dynamic mechanism through which supportive environmental conditions contribute to students' academic well-being.

5.3. Predictors of academic life satisfaction

The hierarchical regression analysis demonstrated that academic grit emerged as the sole significant predictor of academic life satisfaction among pre-service teachers. In contrast, academic burnout consistently showed no significant effect across all models, while fear of failure initially appeared as a significant positive predictor in Step 2 but became non-significant after the inclusion of grit in Step 3. The final model was statistically significant and explained 18.7% of the variance in academic life satisfaction, indicating that grit provides the most substantial unique contribution among the examined variables.

The modest predictive role of academic grit aligns with prior research indicating that individuals with higher levels of grit tend to experience greater academic success and life satisfaction (Clark and Malecki, 2019). Grit, defined as sustained effort and perseverance toward long-term goals, enables students to persist amid the academic demands

typical of teacher education programs. This sustained engagement likely fosters more positive evaluations of academic experiences, contributing to higher academic life satisfaction. Consistent with Lozano-Jiménez et al. (2021), grit also operates alongside supportive learning environments to enhance intrinsic motivation and psychological need satisfaction, which are central to well-being. Similarly, Ain et al. (2021) emphasized grit as a key psychological resource that strengthens resilience and engagement in challenging academic contexts.

The loss of significance of fear of failure after grit was introduced suggests that its initial positive effect may reflect shared variance with grit-related perseverance. While fear of failure may motivate short-term effort, it does not appear sufficient to independently sustain academic satisfaction when more stable, goal-oriented traits are considered. Likewise, academic burnout's non-significant influence suggests that exhaustion and academic strain may be buffered by strong motivational resources such as grit, allowing students to maintain satisfaction despite academic pressures.

From a Self-Determination Theory perspective (Ryan and Deci, 2017), these findings highlight the predominance of more autonomous, self-regulated motivational processes in shaping academic life satisfaction. Grit may reflect internalized goal commitment that supports sustained engagement and well-being. In contrast, fear of failure represents a more controlled form of motivation that lacks long-term predictive power when stronger psychological resources are present. Overall, the findings underscore the importance of fostering academic grit in teacher education programs to enhance students' academic satisfaction, resilience, and long-term professional readiness.

Several limitations warrant acknowledgment. The single-site sample ($n = 128$) constrains generalizability; the cross-sectional design forecloses causal inference; and the explained variance of 18.7% signals unmeasured contributors, such as peer climate, instructor rapport, and financial stress. Self-report instruments also invite social desirability bias. The counterintuitive fear-of-failure finding, in particular, merits follow-up: brief phenomenological interviews with students could illuminate whether collectivist obligation or defensive pessimism underlies that pathway.

6. Conclusion

This study explored how academic burnout, fear of failure, and grit relate to academic life satisfaction among 128 pre-service mathematics teachers. Most participants reported moderate burnout and fear of failure alongside high grit and life satisfaction, suggesting that perseverance toward long-term goals may partially offset everyday academic pressures. The positive correlation between fear of failure and satisfaction was unexpected. Although the present data cannot explain the mechanism, one plausible interpretation is that moderate

performance anxiety serves as a mobilizing force among students already committed to teaching as a vocation. Grit was the only significant predictor of academic life satisfaction, a finding broadly consistent with Duckworth et al.'s (2007) original theorization.

In practical terms, the findings tentatively suggest that small, low-cost classroom practices warrant exploration. Faculty might pilot weekly written reflections in which students narrate a specific academic difficulty and the coping strategies they attempted. Structured peer conversations pairing senior and junior pre-service teachers could help normalize academic struggle as an inherent part of professional formation. During routine advising sessions, brief goal-reconnection prompts may help students articulate why they chose teaching, particularly during high-stress periods such as student teaching placement. The study's single-site, cross-sectional design limits generalizability and causal inference.

Future research should examine diverse Philippine HEIs and employ longitudinal designs to track changes across practicum phases. Mixed-methods approaches may also provide deeper insights into how grit, fear of failure, and academic experiences shape pre-service teachers' academic life satisfaction.

List of abbreviations

AGS	Academic grit scale
ALSS	Academic life satisfaction scale
AVE	Average variance extracted
B	Unstandardized regression coefficient
CVI	Content validity index
F	F-statistic
FF	Fear of failure
HEIs	Higher education institutions
M	Mean
PFAI	Performance Failure Appraisal Inventory
PISA	Program for International Student Assessment
r	Pearson product-moment correlation coefficient
SD	Standard deviation
SDT	Self-determination theory
SE	Standard error
Sig.	Significance
STEM	Science, technology, engineering, and mathematics
t	t-statistic
VIF	Variance inflation factor
W	Shapiro-Wilk test statistic
α	Cronbach's alpha
β	Standardized regression coefficient

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Compliance with ethical standards

Ethical considerations

Ethical approval was obtained from the Office of the Dean and the College Research Unit prior to the conduct of the study. Informed consent was secured from all participants. Participant anonymity and data confidentiality were maintained by removing identifying information and limiting data access to the researchers. All procedures complied with the Data Privacy Act of 2012 (Republic Act No. 10173).

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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