

Research Article

Learning Motivation and Self-Directed Learning as Mediators of Academic Resilience on Well-Being: A PLS-SEM Analysis

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Abstract: This study was conducted to examine the effects of academic resilience and learning motivation, self-directed learning, and academic well-being as mediators of learning motivation and self-directed learning. A cross-sectional research design utilized a sample of 240 students from an elementary school in Indonesia. After the data was collected through structured observation tools, SmartPLS 3 was used to analyze the data using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that academic resilience has a significant effect on self-directed learning and learning motivation, but it doesn't directly impact students' academic well-being. In addition, self-directed learning and learning motivation significantly predict academic well-being. However, the mediation analysis shows that this variability partly acts as a mediator in the relationship between academic resilience and students' academic well-being. The results show that just boosting resilience isn't enough to improve academic health if it's not accompanied by greater learning motivation and self-directed teaching. By providing an integrated model that explains how academic well-being affects the academic resilience of elementary school students in Indonesia, this study helps educational psychology. In addition, it also offers practical advice on how to create school interventions that support students' academic achievement and overall well-being.

Keywords: academic resilience, academic well-being, elementary school students, learning motivation, self-directed learning.

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How to Cite: Putri, D. A., Putra, A., Komariyah, & Zahwa Y, N. S. A. (2026). Learning motivation and self-directed learning as mediators of academic resilience on well-being: A pls-sem analysis. *JEEs: Journal of Education and Educational Sciences*, 3(1), 47-66. <https://doi.org/10.70152/jees.v3i1.398>

Article submitted 2026-06-27. **Revision uploaded** 2026-07-19. **Final acceptance** 2026-07-24.

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INTRODUCTION

Educational environments often characterized by resource limitations see factors such as mental resilience, intrinsic motivation, and students' autonomy in controlling their learning play a crucial role. These factors are the main determinants for maintaining stable academic performance and student happiness. This situation is ideal in terms of the relationship between academic well-being which encompasses mental, physical, and emotional health and the learning process. As a starting point, academic resilience is needed the ability of students to persevere, recover, and continue functioning effectively even when facing academic pressure, failure, or obstacles. Research confirms that academic resilience is not a static end goal, but rather an important mechanism that helps students remain engaged, motivated, high-achieving, and well (Bagdžiūnienė et al., 2025; Sun & Liu, 2023). When this mechanism works well, it is reflected in self-confidence, learning satisfaction, strong emotional attachment to school, and genuine joy in acquiring new knowledge (Irwan & Kamarudin, 2021).

Student's ability to adapt to stress, overcome daily learning obstacles, bounce back from academic setbacks, and persevere is a result of academic resilience. This capacity keeps academic performance and mental health stable, even in difficult or unsupportive school conditions (Williams et al., 2022). Of course, resilience goes hand in hand with motivation. Whether driven internally or by external factors, motivation is the main fuel that keeps students engaged, persistent, and focused on achieving academic goals (Pamungkas, 2022). Interestingly, research during distance learning showed that motivational strategies act as a crucial bridge connecting students' self-regulatory capacity with their academic achievement (Resma Wahyuni et al., 2025). Self-regulated learning occurs when students actively manage their own learning strategies, from setting goals and monitoring progress to evaluating which methods work best for them (Ikhlas et al., 2025).

Although research on academic resilience and academic well-being has expanded quickly, there are still a number of conceptual gaps in the body of current knowledge. First, research on the direct association between academic resilience and academic well-being has produced conflicting findings, indicating the potential existence of mediating factors that have not yet been thoroughly investigated. Second, learning motivation and self-directed learning are rarely tested concurrently within a single structural model, despite the fact that they both theoretically function as psychological processes that bridge resilience and well-being as predicted by Conservation of Resources Theory and Self-Determination Theory. As a result, the relative contributions and interactions among these mediating pathways have not been fully understood. Third, the majority of earlier research used analytical techniques that made it impossible to examine several mediators at once. In order to close this gap, this study uses the PLS-SEM approach to concurrently evaluate the mediating roles of learning motivation and self-directed learning in the link between academic resilience and academic well-being.

Given the distinctive features that distinguish Indonesia's educational system from those of other nations, this stage is becoming more and more crucial. Academic resilience is thought to have both direct and indirect effects on students' academic well-being within these dynamics. Students' capacity for independent study is strengthened and their enthusiasm for learning is ignited when they can overcome obstacles. Our research is based on four theoretical pillars: Social Cognitive Theory, Self-Determination Theory, Resilience Theory, and Self-Directed Learning Theory. Since these concepts have often been explored independently, the study uses an integrated technique to fill in gaps in the educational

psychology literature. Beyond their academic usefulness, the findings ought to assist Indonesian legislators, educators, and counsellors in developing organised intervention programmes. These can focus on strengthening student resilience as well as encouraging intrinsic self-directed learning and motivation. This study specifically evaluates the relationships among academic well-being, learning motivation, academic resilience, and self-directed learning. It also examines how motivation and self-directed learning affect wellbeing and how they function as intermediaries between student well-being and academic resilience. To investigate them, seven main theories have been proposed, each backed by solid theoretical justification.

(H1) Academic resilience influences learning motivation, because Self-Determination Theory states that fulfilling the needs for autonomy, competence, and relatedness fosters a desire to learn. Resilience helps students bounce back from academic failure, boosts their self-confidence, and enhances their intrinsic motivation.

(H2) Academic resilience impacts academic well-being, because Resilience Theory views resilience as an adaptive process for restoring positive psychological functioning after facing challenges. This ability makes students better able to maintain their academic well-being in an academic context.

(H3) Academic resilience influences self-directed learning, because Self-Directed Learning Theory emphasizes the importance of initiative, self-confidence, and control over the learning process. Resilience strengthens students' self-confidence to learn independently and actively manage their own learning.

(H4) It is hypothesized that academic resilience has an indirect effect on academic well-being through learning motivation and self-directed learning. Theoretically, resilience operates through mechanisms of self-regulation and motivation that help students improve their academic well-being.

(H5) Learning motivation influences academic well-being because autonomy theory states that autonomous motivation is related to psychological well-being. When students' basic needs are met, stronger learning motivation will support more positive well-being.

(H6) Self-directed learning demonstrates control and autonomy during the learning process, which impacts academic well-being. This fosters a sense of agency that supports academic well-being and positive psychological experiences.

(H7) Resilience fosters the ability to learn independently, while independent learning contributes to academic well-being. Thus, the effect of resilience on academic well-being is not only direct but also mediated by independent learning.

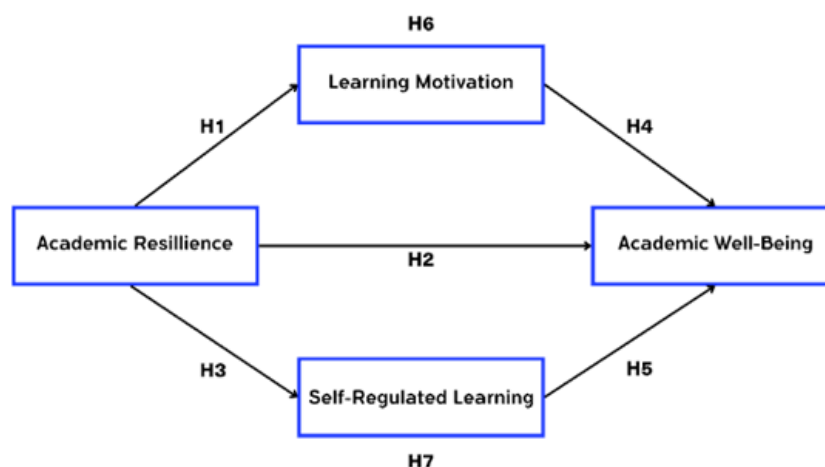


Figure 1. Conceptual Model

THEORETICAL FRAMEWORK

There are four main theories that serve as the scientific foundation for this study: Resilience Theory (Chiappetta-Santana et al., 2022), Self-Determination Theory (Guay, 2022), Self-Directed Learning Theory, and Social Cognitive Theory (Liu, 2025). The combination of these four theories is used as a framework to examine the relationship between student's motivation to learn, academic resilience, self-directed learning skills, and students' academic well-being. By integrating that perspectives, the study can take a closer look at how students' internal factors shape academic dynamics and influence the effectiveness of their learning processes at school.

This study integrates four complementary concepts to provide a coherent framework that explains the shift from academic resilience to academic well-being, rather than treating each theory as a distinct definition. These four theories were selected because they each clarify a distinct idea in the proposed model while combining to provide a coherent, sequential process that links self-control, motivation, hardship, and wellbeing. This mechanism cannot be sufficiently explained by a single theory. Academic resilience, which is described by Resilience Theory (Chiappetta-Santana et al., 2022) as students' capacity to adapt, cope with, and overcome academic adversity, is the predictor variable in this study.

According to earlier research, resilient students are more likely to maintain positive engagement in the face of setbacks, which lays the psychological foundation for the emergence of autonomous motivation. Building on this connection, Self-Determination Theory (Guay, 2022) describes how this kind of adaptive coping strengthens students' motivation to study by satisfying their basic psychological needs for autonomy, competence, and relatedness. This makes motivation the first mediating variable. According to Self-Directed Learning Theory, motivated students take more initiative in organising, observing, and assessing their own learning process, which makes self-directed learning the second mediating variable. This motivation is then anticipated to result in tangible self-regulatory action.

Lastly, Social Cognitive Theory describes how these cumulative self-regulatory processes, which are shaped by resilience, motivation, and self-directed learning, improve students' adaptive functioning and self-efficacy, which eventually show up as improved academic well-being, the study's outcome variable (Liu, 2025). When combined, these four theories create a sequential and integrated framework in which learning motivation and self-directed learning play mediating roles in the direct and indirect effects of academic resilience on academic well-being. The study's hypotheses, which examine the direct impact of academic resilience on academic well-being as well as its indirect impacts through learning motivation and self-directed learning as sequential mediators, are based on this paradigm.

Academic Resilience

Resilience Theory, attributed to Emmy Werner, explains that every individual has a natural capacity to recover and adjust when facing challenging circumstances. Within the context of education, the notion of academic resilience refers to students' ability to stay determined and keep going in the face of intense academic demands, setbacks, or other obstacles related to learning (Melaku et al., 2025). Students who demonstrate strong academic resilience typically tend to see school challenges in a more constructive light, which helps them feel at ease and maintain good psychological well-being throughout their studies (Fullerton et al.,

2021), This way of thinking shows how important mental toughness is in supporting students to reach their full academic potential (Bagdžiūnienė et al., 2025).

This theory can be further elaborated through several core dimensions of academic resilience, including perseverance, self-efficacy, self-regulation, recovery, and help-seeking behavior. These dimensions work hand in hand and enable students to manage everyday academic challenges (Shen et al., 2024). Self-regulation helps students monitor and adjust their strategies, emotions, and learning behaviors when they encounter setbacks or pressure. At the same time, self-efficacy builds their belief in their ability to complete difficult academic tasks (Fullerton et al., 2021; Davis & Hadwin, 2021). Perseverance and recovery enhance students' ability to persist, bounce back, and not give up when learning outcomes are unsatisfactory. Meanwhile, adaptive help-seeking enables students to seek appropriate support from teachers, peers, or the school environment (Romano et al., 2021). Therefore, academic resilience can be defined as a combination of intrapersonal strengths and social skills that enable students to continue thriving under pressure.

The development of academic resilience theory should also emphasize that, more than individual talent, the educational environment plays an important role in shaping students' resilience (Ross & Locke, 2023). Academic satisfaction, a supportive learning climate, teachers' emotional support, and access to psychological assistance are all associated with engagement in learning, psychological well-being, and reduced impact of academic pressure (Romano et al., 2021; Pérez-jorge et al., 2025). Conversely, excessive course load, evaluation pressure, and difficulty balancing personal and academic life may undermine student well-being if not balanced by adequate protective resources (Barbayannis et al., 2022; Pérez-jorge et al., 2025). Therefore, the most recent academic resilience theory is understood as an ecological-psychological theory. It states that personal resilience, self-regulation, and institutional support work together to help students cope with challenges.

Learning Motivation

Motivation to learn refers to the internal and external drives that initiate, shape, and maintain students' learning behavior (Urhahne & Wijnia, 2023). The Theorist learning educational research, several theories are frequently used to explain learning motivation, including expectancy-value theory, social cognitive theory, self-determination theory, interest theory, achievement goal theory, and attribution theory. Self-Determination Theory suggests that the quality of motivation is more influential than the quantity of motivation (Howard et al., 2021; Luo et al., 2021). According to this theory, there is a difference between intrinsic and extrinsic motivation, and it emphasizes that the level of autonomy associated with motivation affects learning outcomes (Howard et al., 2021; Luo et al., 2021). According to this theory, there is a difference between intrinsic and extrinsic motivation, and it emphasizes that the level of autonomy associated with motivation affects learning outcomes. (Guay, 2022), Besides that, the theory divides motivation into two main categories: intrinsic and extrinsic. (Wang et al., 2024). Students with intrinsic motivation learn from curiosity, deep interest, and genuine personal satisfaction. However, external stimuli, such as chasing high grades or pursuing specific rewards, give rise to extrinsic motivation. In this study, learning motivation is seen as an important factor that encourages students to actively participate in class and helps them maintain their overall academic well-being. (Luo et al., 2021).

SDT will explain how learning motivation gets started if this theory is developed. It will also explain how motivation affects achievement through engagement, effort, and learning strategies (Vu et al., 2022). Learning environments that support autonomy, competence-

building feedback, and positive social relationships appear to be key factors in strengthening contemporary learning motivation (Shao et al., 2024). The learning motivation theory that comes from SDT says that when students meet basic psychological needs, they get more motivated. In the end, these needs will drive student engagement, self-regulation, and more sustainable academic achievement (Luo et al., 2021).

Self-Directed Learning

Self-Directed Learning Theory explains that the quality of students' learning motivation is shaped by whether three basic psychological needs are met: autonomy, competence, and social relatedness. When the learning environment supports these three needs, students tend to show more autonomous motivation and more positive academic engagement (Guay, 2022). In an educational context, motivation should be viewed as a continuum that includes amotivation, intrinsic motivation, identified regulation, introjected regulation, and external regulation, rather than simply as high or low (Bureau et al., 2022). Therefore, this theoretical framework emphasizes that learning success is influenced by two factors the level of students' motivation and the quality of their motivation.

Intrinsic motivation comes from students' interest and enjoyment in learning, while extrinsic motivation comes from external needs, values, rewards, or deadlines. External regulations usually hinder perseverance and are even linked to worse health, but new research shows that intrinsic motivation is related to academic success and student health. However, this theory can be expanded to emphasize that extrinsic motivation is not always negative, identified regulation, for example, is an example of more autonomous extrinsic motivation that can help students keep learning after they understand the purpose and value of the task (Bureau et al., 2022). Thus, the relationship between intrinsic and extrinsic motivation is often understood as a process of transformation in quality rather than as two distinct categories (Williams et al., 2022).

Further development of the theory finds that teachers and the learning environment play a key role in determining whether student motivation increases or decreases. Teachers' support for autonomy has been shown to be stronger for fulfilling psychological needs and self-determined motivation than support that does not give students room for choice. In addition, social connectedness plays an important role in enhancing students' intrinsic motivation, persistence, and emotional engagement, while competence appears to be the strongest predictor of self-determined motivation (Pelikan et al., 2021). Therefore, this theory can be developed into a framework stating that students' academic well-being and learning participation will improve if schools support students' social relationships, autonomy, and competence through supportive teaching practices (Slemp et al., 2024).

Academic well-being

The positive state of students in learning that includes engagement, academic satisfaction, a sense of belonging to the university, and low academic burnout is known as academic well-being (Taheri-Kharamah et al., 2024). In elementary education, this concept is also described as a broad measure of students' academic experiences, encompassing engagement in learning, school satisfaction, and a sense of belonging (Sun & Liu, 2023). From a eudaimonic perspective, academic well-being flourishes when students have the opportunity to realize their potential through meaningful learning experiences (Li et al., 2025). Consequently, academic well-being is not only an emotional outcome but also an educational goal linked to optimal learning functioning.

According to Self-Determination Theory, academic well-being arises when the needs for relatedness, autonomy, and competence are met in the learning environment (Kiltz et al., 2024). Recent evidence indicates that these three basic psychological needs significantly predict elementary students' well-being, while their fulfillment is also associated with autonomous motivation and academic engagement (Li et al., 2025). These findings can be used to develop the theory into a Needs-Based Academic Well-Being Model. This model states that a supportive learning environment enhances the fulfillment of a person's psychological needs, which in turn fosters autonomous motivation and engagement for learning. Ultimately, this leads to better academic well-being. In addition, the model shows that students are more likely to avoid tasks, reduce engagement, and develop negative habits that undermine academic well-being if psychological needs are not met (Kiltz et al., 2024).

Because academic well-being is shaped not only by intrinsic motivation but also by academic demands, social support, and instructional design, the development of this theory should also consider the role of academic resources and structures (Bureau et al., 2022). Moreover, academic satisfaction is a strong predictor of psychological well-being and is negatively correlated with depression, anxiety, and stress. Therefore, the developed theory of academic well-being states that academic well-being flourishes most strongly when psychological needs are met, academic demands are manageable, and the campus environment supports social relationships and student development (Kiltz et al., 2024).

METHODS

Research

An analyze regarding that surrounding area academic resilience, academic prosperity, self-directed, and learning motivation among students, this examination Engages descriptive cross-sectional survey plan. That plan typically used to capture relationships among constructs with a center point in period also suitable for exploratory education-based studies (Segbenya et al., 2022). This method is useful when researchers wish to describe patterns, trends, and correlations without manipulating variables within the natural environment of learners (Mylonas et al., 2024).

Sample

That example make it examination comprised made with 240 students from one elementary school. The demographic profile made with that examination shows that most of participant male (N = 126; 50.4%) and female (N = 124; 49.6%). Regarding age distribution, the most common age was 12 years (N = 53; 21.2%), followed by 10 years (N = 50; 20.0%) and 11 years (N = 50; 20.0%). The oldest participant was 14 years old (N = 1; 0.4%), reflecting demographic structure make with the elementary school where the sampling did carried out. Respondents were selected using simple random sampling so all child equivalent opportunity of being chosen. This method aligns with current sampling practices in quantitative educational research, which emphasize reducing selection bias. Although the single-site study is effective for initial mapping, the findings must be explained carefull because restriction in generalizing beyond that context of this school.

Data Collection

Academic resilience was measured using a questionnaire (Cassidy et al., 2015), which encompasses two main dimensions: perseverance and adaptive help-seeking. Initially, this construct consisted of four indicators: DTMN1, DTMN5, FCS3, and FCS6, hese indicators want

measured using a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). After that convergent validity test using PLS-SEM was completed, only the DTMN5 and FCS3 indicators were considered valid and used in subsequent analyses. Consequently, the DTMN1 and FCS6 indicators were excluded from the model because their outer loadings were below that minimum threshold of 0.70 (Hair et al., 2024). Therefore, only the DTMN5 and FCS3 indicators were deemed valid and used in subsequent analyses.

Table 1. Specification Instrument Academic Resilience

No.	Aspect	Description of the aspect
1.	Determination	“I strive to achieve my academic goals, no matter how long it takes.” “When it comes to completing schoolwork, I always try as hard as I can.”
2.	Reflecting	“I complete my schoolwork no matter how difficult it is.” “Even though I struggle in school, I still do my best.”
3.	Focus	“Once I set a goal at school, I strive to overcome any challenges that arise.” “At school, I work hard to achieve challenging goals.”

Learning motivation was measured using a questionnaire (Pintrich et al., 1993), focusing on students' from the inside or from the outside motivational orientations in schooling activities. Initially, the construct consisted of six items, namely EMCL1, EMCL2, EMCL4, RTL1G1, RTL1G3, and RTL1G4, measured using a four-point Likert scale. After empirical validity testing, four indicators failed to achieve the minimum outer loading value of 0.70 and were excluded from the model. Therefore, EMCL2 and RTL1G4 were retained as valid indicators representing the learning motivation construct. Self-report questionnaires are commonly used to assess learning motivation because motivation is an internal psychological process that cannot be directly observed (Ryan et al., 2020).

Table 2. Specification Instrument Learning Motivation

No.	Aspect	Description of the aspect
1.	Emotion Motivation Control	“Thinking about things that make me happy to stay motivated.” “Trying to calm myself down (breathing exercises, counting) to stay focused.” “Telling myself: ‘Come on, concentrate this practice is important.’”
2.	Reflecting	“How can I make fewer mistakes next time?” “How can I feel better next time?” “How can I do my best next time?”

Self-directed learning was measured using an instrument assessing the ability to plan, monitor, and control learning activities independently. Initially, this construct consisted of six indicators: PLNG1, PLNG2, MNTG1, MNTG3, CCL2, and CCL5. However, after convergent validity analysis, the indicators PLNG2, MNTG1, and CCL2 were eliminated because their outer loading values did not meet the 0.70 threshold. As a result, PLNG1, MNTG3, and CCL5 were retained as reliable indicators for the self-directed learning construct (Hair et al., 2024).

Table 3. Specification Instrument Self-Directed Learning

No.	Aspect	Description of the aspect
1.	Planning	“Before I start, I ask myself, ‘How can I feel good/comfortable?’” “Before I start, I ask myself, ‘How can I do my best?’”
2.	Monitoring	“While working on a task, I check to see if I understand what I’m doing.” “While working on a task, I check how hard I’m working.”
3.	Cognitive Control	“I try new ways to complete difficult exercises.” “I think of better ways to complete difficult tasks.” “I try several approaches to complete difficult tasks.”

Academic well-being was measured using a (Renshaw et al., 2015), which covers students’ social, emotional, and psychological experiences related to academic life. Initially, the instrument consisted of twelve items: EIS1, EIS2, PAS1, PAS2, PASC1, PASC2, PCS1, PCS2, SPS1, SPS2, SPS3, and SPS4. answers then held together using a four-value Likert level. After convergent validity testing, six indicators were excluded because they did not meet the minimum outer loading requirement of 0.70. Consequently, EIS2, PAS2, PASC1, PCS1, SPS1, and SPS3 remained as valid measures for subsequent analysis. Questionnaires are considered effective for measuring academic well-being because they allow respondents to report their subjective experiences and perceptions of their academic lives (Renshaw et al., 2015).

Table 4. Specification Instrument Academic Well-Being

No.	Aspect	Description of the aspect
1.	Enjoyment In School,	“I’m happy that I can do something I enjoy at school.” “I’m happy that I can show what I’ve learned.”
2.	Positive Attitudes Toward School	“I like going to school.” “No matter what happens, school is a good thing for me.”
3.	Positive Academic Self-Concept	“I have no trouble following school rules.” “I can solve my academic problems easily.”
4.	Physical Complaints in School	“I often lose my appetite because I’m thinking about schoolwork.” “I feel so anxious about school that it makes me feel unwell.” “I often get stomachaches from worrying about school.”
5.	Social Problems in School	“I have problems getting along with my classmates.” “I have a problem with one particular friend.” “I feel like an outsider or like I’m being excluded in class.”

Data Analysis

Before testing the structural hypotheses, data analysis in this study began with a multivariate normality test using skewness and kurtosis values. Skewness and kurtosis values approaching absolute values of 2 and 7, respectively, were used as guidelines for assessing acceptably non-normal data when using robust parametric statistics (Curran et al., 1996). For kurtosis, a more lenient threshold of up to ± 10 was applied. This step is crucial for determining the appropriate analytical approach because PLS-SEM does not require a strictly normal data distribution like CB-SEM does. Therefore, data that do not meet the assumption of multivariate normality can still be analyzed using PLS-SEM, and the results remain valid.

Common method variance (CMV) analysis was conducted using two approaches to ensure that the identified relationships between constructs were not due to CMV. According to the Variance Inflation Factor (VIF) values, which were below the conservative threshold of 3.3, common method variance is unlikely to be a serious issue in this study. Single-factor test was also applied, with the stipulation that a single factor explaining less than 50 percent of the variance indicates that common method bias does not significantly affect the study. These two procedures reinforce the confidence that the resulting structural relationships truly reflect the measured phenomena, rather than being artifacts of a single data collection method.

After testing the main structural model, the analysis continued with Pearson's correlation test to examine that magnitude make wit orientation the existence of correlation. The significance levels were set at $p < 0.05$ and $p < 0.01$. Hierarchical multiple regression analysis was also used to determine whether motivation and self-directed learning significantly predict academic resilience. In the first stage, control variables such as grade level and gender were included, and in the second stage, the main predictor variables were added. In addition, an independent samples t-test was used to compare levels of academic resilience between groups based on gender. On the other hand, a paired samples t-test was used to compare the dimensions of intrinsic and extrinsic motivation within the same group. Through this series of comprehensive analyses, researchers were able to describe the general structural relationships among constructs and also explain more specific variations and differences among respondent groups.

RESULT

Normality Measure

Examining the distribution of data across all research variables schooling well-being (AWB), Self-Directed schooling (SDL), schooling Motivation (LM), and schooling Resilience (AR) is the first step in determining the proper analytical technique. Table 5 shows that kurtosis values range from -1.47 to -0.989, and the univariate skewness values range from -0.736 to -0.604. Additionally, significant kurtosis across all constructions is shown by the Z_kurt values. The Mardia multivariate test supports these first results, which recorded skewness values of $b = 12.896$; $z = 537.319$; $p = 0.001$ and kurtosis values of $b = 58.853$; $z = 39.770$; $p = 0.001$. Thus, the research data do not meet the assumption is not met and conventional methods cannot be used, this study employs PLS-SEM as a more flexible analytical approach.

Table 5. Skewness and Kurtosis

Univariate skewness and kurtosis						
Construct	Skewness	SE_skew	Z_skew	Kurtosis	SE_kurt	Z_kurt
AWB	-0.605	0.154	-3.929	-1.47	-0.37	-4.79
SDL	-0.665	0.154	-4.292	-1.36	-0.37	-4.43
LM	-0.736	0.154	-4.779	-0.989	-0.37	-3.22
ARS	-0.604	0.154	-3.922	-1.41	-0.37	-4.59
Mardia's multivariate skewness and kurtosis						
	b		z		p-value	
Skewness	12.89566		537.31923		< 0.001	
Kurtosis	58.85272		39.77004		< 0.001	

Note: AWB = Academic Well-Being, SDL = Self-Directed Learning, LMO = Learning Motivation and ARS = Academic Resilience.

Common Method Variance

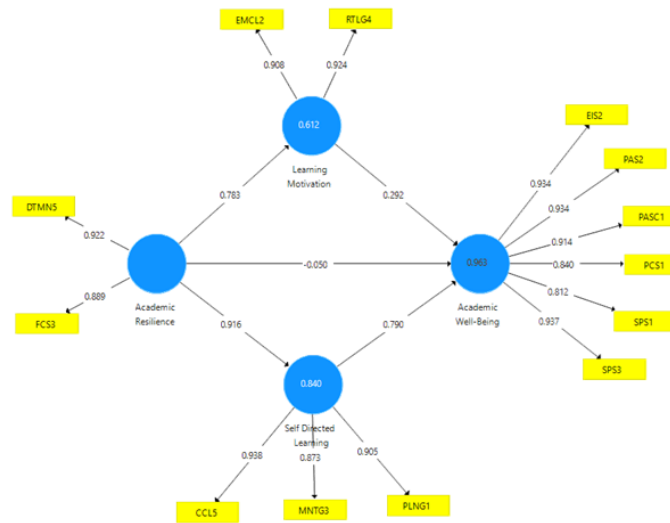


Figure 3. Algorithm Results from PLS-SEM

This study used two widely advised techniques to reduce potential bias resulting from the use of a single data source in order to guarantee that the result were unaffected by common method variance (CMV) (Vanti & Supandi, 2020). First, collinearity between the constructs was evaluated using the variance inflation factor (VIF). Since all VIF values were below the suggested cutoff of 3.3, CMV was not anticipated to be an issue. Second, the first component explained 30.73% of the total variance, which is much less than the permissible maximum of 40%, according to Harman's single-factor test. According to these findings, common technique variance was not a major problem in this investigation (Vanti & Supandi, 2020).

Table 6 indicates that the measurement model demonstrates satisfactory psychometric properties. All item loadings are above the recommended threshold of 0.60, suggesting good indicator reliability. Each latent variable passed the reliability test. This is indicated by CR and Cronbach's alpha values above 0.70 (Sarstedt & Liu, 2024), confirming strong internal consistency and indicating that the indicators reliably measure their respective constructs. Based on AVE values, convergent validity was adequate for the majority of variables; however, academic well-being was marginally below the 0.5 level (Hair, 2016), when the composite reliability is more than 0.7, convergent validity I still satisfied. VIF values below 2.1 also support the absence of multicollinearity (Isabelle et al., 2025), c onfirming that the measurement model is generally adequate.

Table 6. Construct Reliability and Validity

Construct	Item	IL	α	ρ_A	CR	AVE	VIF _{om}	p-value
Learning Motivation (Two items)	EMCL2	0.904	0.809	0.813	0.901	0.839	1.853	***
	RTLG4	0.924					1.853	***
Academic Resilience (Two items)	DTMN5	0.914	0.782	0.789	0.901	0.820	1.700	***
	FCS3	0.894					1.700	***
	EIS2	0.934	0.950	0.952	0.961	0.804	6.427	***

Academic Well-Being (Six items)	PAS2	0.934					9.361	***
	PASC1	0.914					5.270	***
	PCS1	0.840					2.665	***
	SPS1	0.812					2.962	***
	SPS3	0.937					10.635	***
Self-regulated Learning (Three items)	CCL5	0.938	0.890	0.892	0.932	0.820	3.653	***
	MNTG3	0.873					2.185	***
	PLNG1	0.905					2.953	***

Note: EMCL: Emotion Motivation Control, RTGL: Reflecting, DTMN: Determination, FCS: Focus, EIS: Enjoyment in School, PAS: Positive Attitudes Toward School, PASC: Positive Academic Self-Concept, PCS: Physical Complaints in School, SPS: Social Problems in School, CCL: Cognitive Control, MNTG: Monitoring, PLNG: Planning.

Discriminant Validity

Table 7 presents the discriminant validity assessment using the Fornell–Larcker criterion. The square root of the average variance extracted (AVE) for the four constructs ranged from 0.897 to 0.916 (Sarstedt et al., 2022). Schooling resilience, schooling motivation, and schooling well-being all satisfied the suggested standard, but self-directed learning did not. Specifically, its correlations with academic resilience (0.914) and academic well-being (0.963) were higher than the square root of its AVE (0.906), indicating that discriminant validity for this construct was not fully established.

These findings suggest a considerable conceptual overlap between self-directed learning and the two related constructs. To provide a more robust assessment, discriminant validity was also evaluated using the heterotrait–monotrait ratio (HTMT), which is considered a more sensitive criterion. Overall, all HTMT values remained below the conservative threshold of 0.85, with the highest value observed between learning motivation and academic well-being 0.853, indicating that the constructs were still distinguishable. Nevertheless, the results of the discriminant validity assessment were not entirely consistent. While the HTMT criterion supported discriminant validity, the Fornell–Larcker criterion indicated potential overlap involving self-directed learning. This issue may reflect the close conceptual relationship among these constructs and is discussed further in the limitations section.

Table 7. HTMT Ratio and The Fornell Larcker Criterion

Construct	Academic Resilience	Academic Well-Being	Learning Motivation	Self-Dericted Learning
Academic Resilience	0.906			
Academic Well-Being	0.900	0.897		
Learning Motivation	0.783	0.845	0.916	
Self-Dericted Learning	0.914	0.963	0.750	0.906
HTMN ratio.				
Academic Resilience				
Academic Well-Being	0.740			
Learning Motivation	0.787	0.853		
Self-Dericted Learning	0.706	0.790	0.685	

Although some HTMT values do not meet the Fornell-Larcker criteria, discriminant validity can still be established, since all HTMT values are below the 0.90 threshold, in line with the recommendations of who state that the HTMT is a more accurate and sensitive criterion than

the Fornell-Larcker criterion for detecting issues with discriminant validity in PLS-SEM models.

Assessment of Structural Model

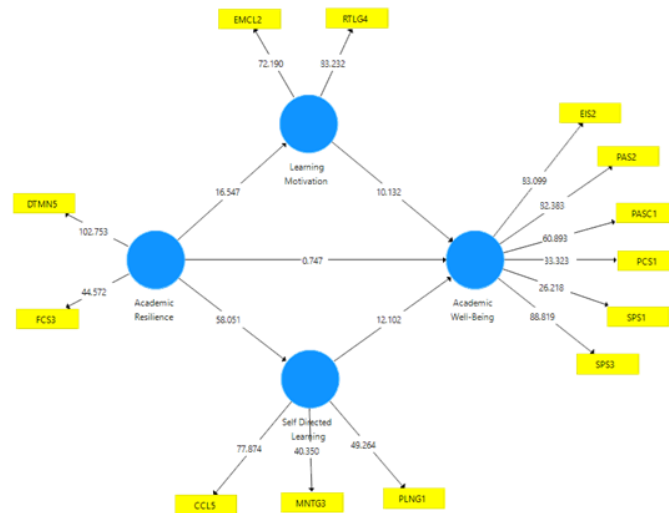


Figure 4. PLS-SEM Bootstrapping Results

The structural model was evaluated using a bootstrapping procedure with 10,000 resamples (Isabelle et al., 2025). Bootstrapping was used in this study because it is a non-parametric resampling technique that does not rely on the assumption of multivariate normality. Since the preliminary analysis showed that the data distribution deviated from normality, bootstrapping provides a robust method for estimating the accuracy of PLS-SEM parameter estimates by generating standard errors and t-statistics through repeated resampling. As shown in Tables 8 and 9, the analysis revealed significant relationships among the study constructs. Before interpreting these relationships, multicollinearity was assessed by examining the variance inflation factor (VIF) for each structural path. The VIF values to the paths from ARS to LMO (1.000), ARS to AWB (1.347), LMO to AWB (1.817), ARS to SDL (1.000) and SDL to AWB (1.734) overall, it is below the recommended limit of 3 (Martin et al., 2023). These results indicate that multicollinearity is not a concern, allowing the structural relationships to be interpreted with confidence.

The effect of academic resilience on academic well-being is positive and statistically significant ($\beta = 0.219$, $t = 2.895$, $p = .004$). Academic resilience also showed significant positive effects on self-directed learning ($\beta = 0.436$, $t = 5.355$, $p < .001$) and learning motivation ($\beta = 0.477$, $t = 6.222$, $p < .001$). Furthermore, both self-directed learning ($\beta = 0.239$, $t = 2.780$, $p = .005$) and learning motivation ($\beta = 0.394$, $t = 4.099$, $p < .001$) had significant positive effects on academic well-being, indicating that these constructs contribute meaningfully to students' academic well-being.

The effect size (f^2) analysis indicated that the significant relationships ranged from small to moderate in magnitude. Academic resilience had a small effect on academic well-being ($f^2 = 0.072$), but showed moderate effects on learning motivation ($f^2 = 0.294$) and self-directed learning ($f^2 = 0.235$). In addition, learning motivation exerted a moderate effect on academic well-being ($f^2 = 0.173$), whereas the effect of self-directed learning on academic well-being was small ($f^2 = 0.067$). Overall, these findings suggest that academic resilience plays a more

substantial role in shaping self-directed learning and learning motivation than in directly influencing academic well-being.

The coefficient of determination (R^2) was used to assess the explanatory power of the structural model for each endogenous construct. Academic resilience accounted for 22.7% of the variance in learning motivation ($R^2 = 0.227$) and 19.0% of the variance in self-directed learning ($R^2 = 0.190$). For academic well-being, the model explained 50.7% of the total variance ($R^2 = 0.507$), indicating that academic resilience self-directed learning and learning motivation, together provide substantial explanatory power for this construct.

Table 8. Model of Structure

Structural Path.	β	M	SD	t-value	p-values	LLCI 2.5 %	ULCI 97.5 %	F ²	R ²
ARS→LMO	0.783	0.785	0.048	16.420	0.000	0.687	0.873	0.921	0.613
ARS→SDL	0.914	0.915	0.016	56.815	0.000	0.881	0.944	5.101	0.836
LMO→AWB	0.281	0.278	0.031	9.046	0.000	0.213	0.335	1.582	0.962
SDL→AWB	0.753	0.755	0.025	30.207	0.000	0.706	0.805	6.606	

Table 9. Total Effect

	Original Sample O	M	STDEV	O/STDEV	P Value
H1: ARS→AWB	0.90	0.90	0.02	52.83	***
H2: ARS→LMO	0.78	0.78	0.05	16.15	***
H3: ARS→SDL	0.92	0.92	0.02	57.06	***
H4: LMO→AWB	0.29	0.29	0.03	10.20	***
H5: SDL→AWB	0.79	0.80	0.07	12.03	***

Note: LMO stands for learning motivation, SRL for self-regulated learning, AWB for academic well-being, and ARS for academic resilience.

Significant positive relationships were observed between academic resilience and learning motivation ($\beta = 0.783$, $p < .001$), as well as between academic resilience and self-directed learning ($\beta = 0.914$, $p < .001$). In addition, both learning motivation ($\beta = 0.281$, $p < .001$) and self-directed learning ($\beta = 0.753$, $p < .001$) were positively associated with academic well-being. These findings indicate that students with higher levels of academic resilience are more likely to be motivated and engage in self-directed learning, both of which are associated with better academic well-being. Accordingly, all proposed hypotheses were supported, as the structural relationships were both statistically significant and aligned with the underlying theoretical framework.

This mediation analysis shows that self-directed learning and learning motivation play an important role as mediating variables in the relationship between academic resilience and academic well-being, providing support for H6 and H7. The indirect effect through learning motivation was significant ($\beta = 0.188$, $p = .002$), as was the indirect effect through self-directed learning ($\beta = 0.104$, $p = .014$), indicating partial mediation in both pathways. These findings it is known that academic resilience has a positive effect on academic well-being is transmitted not only through a direct effect but also through students' motivation and their ability to regulate their own learning. Accordingly, both mediating hypotheses were supported, as the confidence ranges of all indirect effects excluded 0 and they were all statistically significant.

Results of Mediation

The findings of the mediation analysis investigating the functions of learning self-directed learning (SDL) and motivation (LMO) in the connection between academic academic well-being (AWB) and resilience (ARS) are shown in Table 10. The findings indicate that academic resilience had significant indirect effects on academic well-being through both learning motivation ($\beta = 0.188$, $t = 3.137$, $p = .002$, 95% CI [0.081, 0.313]) and self-directed learning ($\beta = 0.104$, $t = 2.452$, $p = .014$). These results provide evidence of partial mediation for both indirect pathways. According to these findings, learning motivation and self-directed learning both serve as partial mediators in the relationship between academic resilience and academic well-being. This means that academic resilience affects well-being both directly and indirectly by increasing students' drive to learn and their ability to learn on their own. In this structural model, learning motivation has a bigger mediating function than self-directed learning, as seen by the larger mediating impact of LMO ($\beta = 0.188$) compared to SDL ($\beta = 0.104$).

Table 10. Mediation Analysis

Mediation analysis	β	M	SD	T value	P value	2,5%	97,5%	Decision
ARS→LMO→AWB	0.188	0.191	0.060	3.137	0.002	0.081	0.313	PM
ARS→SDL→AWB	0.104	0.110	0.043	2.452	0.014	0.031	0.194	PM

Note: PM stands for partial mediation.

Predictive Relevance

The model's predictive performance was evaluated by comparing the PLS_RMSE and Q^2_{predict} values with those obtained from a linear regression benchmark, as recommended by (Sofyani, 2025). As shown in Table 11, the Q^2_{predict} values for learning motivation (0.810), self-directed learning (0.608), and academic well-being (0.835) were all greater than zero, providing evidence of adequate predictive relevance. At the indicator level, the differences between PLS_RMSE and LM_RMSE were minimal for most items. For instance, EMCL2 (−0.001) and SPS1 (0.000) showed nearly identical prediction errors under both approaches, indicating that the PLS model achieved predictive accuracy comparable to the linear regression model.

Item-level conclusions differed among the indicators. While item CCL5 was categorized in favor of LM because its PLS_RMSE (0.249) was much greater than its LM_RMSE (0.236), item EMCL2 was classified in favor of PLS because its PLS_RMSE (0.397) was less than its LM_RMSE (0.398), and item SPS1 displayed the same results for both. Higher PLS_RMSE (0.241) and a lower LM_RMSE (0.152), item SPS 3 had a comparatively substantial difference (0.089), suggesting that the basic linear regression model outperformed the PLS model in terms of prediction accuracy. (Sofyani, 2025). Table 7 also displays the complete cross-loading matrix, which shows how each indicator loaded on its related construct in relation to the other constructs in the model.

Table 11. PLS-Predict

Items	PLS_RMSE	Q^2_{Predict}	LM_RMSE	Q^2_{Predict}	Q^2_{Predict} (Construct)	PLS_RMSE- LM_RMSE	Decision
EMCL2	0.397	0.451	0.398	0.448	0.810	-0.001	PLS
RTL4	0.302	0.566	0.304	0.561		-0.002	
CCL5	0.249	0.730	0.236	0.757	0.608	0.013	LM
MNTG3	0.261	0.725	0.259	0.730		0.002	

PLNG1	0.304	0.604	0.299	0.617		0.005
EIS2	0.327	0.539	0.311	0.584	0.835	0.016
PAS2	0.247	0.733	0.225	0.778		0.022
PASC1	0.283	0.656	0.264	0.700		0.019
PCS1	0.302	0.625	0.299	0.634		0.003
SPS1	0.298	0.617	0.298	0.618		0.000 Equal
SPS3	0.241	0.741	0.152	0.896		0.089 LM

Note: PLS = PLS-SEM model shows higher predictive accuracy; LM = Linear model shows higher predictive accuracy; Equal = Mixed results with moderate predictive power; EMCL=Emotion Motivation Control; RTGL=Reflecting; DTMN=Determination; FCS=Focus; EIS=Enjoyment in School; PAS=Positive Attitudes Toward School; PASC=Positive Academic Self-Concept; PCS=Physical Complaints in School; SPS=Social Problems In School; CCL=Cognitive Control; MNTG=Monitoring; PLNG=Planning.

Taken together, the findings from the preliminary, measurement, structural, and predictive model assessments provide consistent support for the proposed research model. Each stage of the analysis met the established statistical criteria, strengthening the overall validity of the model. The results demonstrate that academic resilience influences academic well-being both directly and indirectly through self-directed learning and schooling motivation. Overall, these findings indicate that the proposed structural model is statistically robust and that the relationships among the other constructs in this study are theoretically coherent and empirically supported.

DISCUSSION

This study's PLS-SEM findings offer a deeper understanding of the psychological factors shaping elementary school students' academic well-being, revealing a relational pattern that contradicts the traditional view of academic resilience as the sole determinant of student success. Academic resilience does not have a direct impact on academic well-being; instead, its effect occurs through mediating pathways driven by self-directed learning and learning motivation. These findings extend resilience theory (Cepeda-Carrión et al., 2022) by showing that resilience is only a "base capacity" requiring "activators" motivation and independence to produce tangible well-being outcomes. In other words, bouncing back from adversity does not guarantee happiness at school unless paired with effective self-regulation and autonomous motivation.

The role of learning motivation as the strongest mediator in this model supports the Self-Determination Theory proposed by engagement (Guay, 2022). When students are able to integrate resilience into their intrinsic motivation, they do not merely survive academic pressure but also find personal satisfaction. This aligns with the findings of (Agormedah, 2025), which emphasize that learning engagement and academic satisfaction are crucial predictors of student well-being. Autonomous motivation acts as the bridge that allows resilience to transform into positive emotional states, a nuance often overlooked in studies that focus solely on linear relationships.

Furthermore, the contribution of self-directed learning as a mediator underscores the importance of "student empowerment" within the classroom environment. This research indicates that resilient students tend to be more proactive in planning and monitoring their learning processes (Ikhlas et al., 2025). This capability creates a more manageable academic environment, thereby reducing the anxiety and physical complaints often experienced by

students when facing heavy curriculum loads. These findings are consistent with the social cognitive approach (Liu, 2025), which states that the interaction between internal factors (resilience) and behavior (independence) significantly shapes students' perceptions of their well-being at school.

Theoretically, these results contribute to the educational psychology literature by integrating four key pillars resilience, motivation, independence, and well-being into a coherent framework. These results also address a research gap in the Indonesian context (Septintiyas et al., 2022), where these variables have previously tended to be examined in isolation. The success of this model in explaining over 50% of the variance in academic well-being suggests that school interventions in Indonesia should not be partial; efforts to improve resilience must be accompanied by programs that strengthen self-directed learning and fulfill students' psychological needs (autonomy, competence, and relatedness).

Although this model possesses adequate predictive power, the finding of minor discrepancies between PLS predictions and linear models (Martin et al., 2023) suggests that variables outside the model such as family social support or more specific classroom climates may exert influences that have not been fully captured. Therefore, this discussion concludes that academic well-being is not solely the result of mental toughness. It is a dynamic process that requires structural support from the school environment to enable students to maximize their potential.

CONCLUSION

This study found in resilience academic the impact is not direct on academic performance; rather, it to perform crucial role in enhancing elementary school child desire to learn independently and participate actively in self-directed learning. Motivation for self-learning and independent learning habits play a crucial involved creating the relationship between academic well-being with academic resilience. These two factors is responsible for students' satisfaction and well-being at school. Therefore, a framework for building resilience should be systematically integrated into educational approaches in elementary schools. It should also support students in learning independently within a positive and supportive classroom environment. This study, however, has several limitations. For example, the sample is limited to a specific geographical context, and the cross-sectional design allows only non-causal conclusions to be made. To gain a better understanding of the mechanisms underlying students' academic well-being, further research is recommended to use a longitudinal design with a broader and more diverse sample. This approach should also consider moderator and qualitative variables such as teacher support, family environment, and socioeconomic background.

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