

The effect of self-efficacy and learning motivation on learning engagement among elementary school students

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Abstract. This research examined the contribution of self-efficacy and learning motivation to learning engagement among elementary school students. A quantitative explanatory design was employed using a survey of 62 fourth-grade students at SDN Tegal Alur 05 Pagi, West Jakarta, comprising 31 students from Grade IVA and 31 from Grade IVB. Data were collected using five-point Likert scales measuring self-efficacy, learning motivation, and learning engagement. Prior to the main study, the instruments were pilot-tested with 32 students; 82 of 90 items met the validity criteria. Data were analyzed using descriptive statistics, Pearson's correlation, and multiple linear regression. The results indicated that self-efficacy was a significant positive predictor of learning engagement ($\beta = 0.403$, $t = 4.433$, $p < 0.001$). Learning motivation also showed a significant positive contribution ($\beta = 0.514$, $t = 5.653$, $p < 0.001$). When considered jointly, self-efficacy and learning motivation significantly predicted learning engagement, $F(2, 59) = 40.806$, $p < 0.001$, with $R^2 = 0.580$. Thus, the model explained 58.0% of the variance in learning engagement. Learning motivation demonstrated a relatively stronger predictive contribution than self-efficacy.

Keywords: self-efficacy; learning motivation; learning engagement; educational psychology; elementary school students

1. INTRODUCTION

Learning engagement is an important component of students' experiences at school because it reflects how actively students participate in the learning process rather than merely attending or completing learning activities as a formal requirement. Such engagement can be observed through students' willingness to participate in learning activities, persistence when facing difficulties, attention to academic tasks, and interest in learning activities. At the elementary school level, engagement warrants particular attention because students are developing learning patterns and academic habits that may continue to shape their educational experiences at subsequent levels of schooling. Wicaksono et al. (2025) developed a learning engagement scale specifically contextualized for Indonesian elementary school students, involving 330 students from Grades IV, V, and VI. Their findings indicated that learning engagement among elementary school students comprises four dimensions: learning enthusiasm, learning persistence, learning autonomy, and learning reflection. These findings suggest that learning engagement at the elementary level extends beyond students' classroom activity alone, encompassing persistence, autonomy, and the capacity to reflect on their learning processes.

Learning engagement represents an important dimension of students' experiences at school because it reflects the extent to which they participate meaningfully in academic activities. Such engagement encompasses students' willingness to take part in learning tasks, maintain effort when difficulties arise, attend to academic demands, and remain interested in the activities they undertake. At the elementary level, these characteristics

are particularly relevant because students are developing learning habits and patterns of academic participation that may extend into subsequent stages of education.

Empirical studies have provided evidence that students' psychological characteristics are related to their engagement in learning. Chen et al. (2021), for example, examined 519 fourth- and fifth-grade students in China and described academic engagement in terms of students' active participation in learning and their emotional commitment to academic activities. Their findings indicated a positive association between academic engagement and students' psychological characteristics, including academic self-efficacy. Zhu et al. (2024) similarly reported that self-efficacy and self-concept contributed to the explanation of learning engagement among elementary school students. Taken together, these findings suggest that students' engagement may be influenced not only by the immediate instructional environment but also by psychological resources that shape how they approach academic demands.

Among these psychological resources, self-efficacy provides an important perspective for understanding students' engagement. Bandura (1997), within the framework of social cognitive theory, conceptualizes self-efficacy as an individual's belief regarding their capability to organize and carry out actions necessary to achieve particular goals. In educational settings, such beliefs can influence students' responses to academic tasks, the effort they are prepared to expend, and their persistence when difficulties are encountered. Evidence from Chen et al. (2021) supports this perspective, as their findings showed that academic self-efficacy was associated with academic engagement among elementary school students. Thus, students' perceptions of their own academic capabilities may constitute an important psychological basis for sustained participation in learning activities.

Self-efficacy, however, does not operate independently of students' learning motivation. Although the two constructs represent different psychological processes, both can shape students' involvement in learning. Motivation concerns the forces that initiate and sustain learning activity, whereas self-efficacy reflects students' judgments about their capability to perform the actions required to attain learning goals. Woo and Song (2022), studying 1,094 elementary school students in Gyeonggi-do, South Korea, reported significant positive relationships between learning motivation, academic self-efficacy, and learning immersion. Their findings further indicated a role for academic self-efficacy in the association between motivation and learning immersion. Evidence from Indonesia also points to a connection between these psychological constructs. Pada et al. (2024) reported a positive and significant relationship between self-efficacy and learning motivation among fifth-grade students.

Additional evidence can be found in research focusing specifically on behavioral manifestations of engagement. Hidayatullah et al. (2024) investigated 660 fifth- and sixth-grade students from four elementary schools in Surabaya and examined motivation, self-efficacy, and behavioral engagement in mathematics learning. Their results showed that motivation was related to self-efficacy and behavioral engagement. Self-efficacy was likewise associated with behavioral engagement and mediated the relationship between motivation and behavioral engagement. Fitriah and Indrakurniawan (2025), meanwhile, reported a positive and significant effect of self-efficacy on learning motivation among 71 students in Grades IV–VI. These findings collectively indicate that self-efficacy and motivation represent relevant psychological dimensions for examining students' participation and persistence in learning.

Despite this growing body of evidence, previous studies have not employed an entirely consistent conceptualization of learning engagement. Hidayatullah et al. (2024) examined behavioral engagement specifically within mathematics learning, while Woo and Song (2022) investigated learning immersion. Wicaksono et al. (2025) approached

the construct from the Indonesian elementary school context by developing a learning engagement scale involving 330 students in Grades IV–VI. Their measurement identified four dimensions: learning enthusiasm, learning persistence, learning autonomy, and learning reflection. This work is particularly relevant because it demonstrates that learning engagement among Indonesian elementary school students encompasses more than observable classroom participation.

A study particularly close to the present research is Muslimin et al. (2026), which examined self-efficacy and learning motivation as predictors of learning engagement among elementary school students. Using data from 50 students, the study reported significant positive effects of both variables on learning engagement, both separately and jointly. While this finding provides direct empirical support for the proposed relationships, evidence from additional school contexts and different groups of students remains valuable for assessing the consistency of the observed pattern.

The present study addresses this need by examining fourth-grade students at SDN Tegal Alur 05 Pagi, West Jakarta. Rather than assigning either self-efficacy or learning motivation a mediating role, the study treats both constructs as independent predictors of learning engagement. This configuration permits the contribution of each predictor to be examined while simultaneously assessing the extent to which the two variables collectively account for differences in students' learning engagement. Multiple linear regression is therefore employed to evaluate the individual and joint predictive contributions of self-efficacy and learning motivation.

Accordingly, this study examines the influence of self-efficacy and learning motivation on learning engagement among elementary school students, both separately and simultaneously. Three hypotheses are formulated: H1: Self-efficacy has a positive and significant effect on learning engagement among elementary school students. H2: Learning motivation has a positive and significant effect on learning engagement among elementary school students. H3: Self-efficacy and learning motivation simultaneously have a significant effect on learning engagement among elementary school students.

2. METHODS

2.1 Research Design

This study employed a quantitative approach with an explanatory design using a survey method. The design was used to examine the effects of self-efficacy and learning motivation on learning engagement among elementary school students. In the research model, self-efficacy was specified as the first independent variable (X1), learning motivation as the second independent variable (X2), and learning engagement as the dependent variable (Y). Data were collected through questionnaires administered to the students. The resulting data were converted into numerical scores and analyzed to examine the effects of each independent variable on learning engagement individually, as well as the simultaneous effect of both variables.

2.2 Participants

The study involved 62 fourth-grade students at SDN Tegal Alur 05 Pagi, West Jakarta, comprising 31 students from Grade IVA and 31 students from Grade IVB. Data collection was conducted in July 2026. Prior to the main data collection, the research instruments were pilot-tested with 32 students. This pilot-testing stage was conducted to evaluate the validity and reliability of the instruments before their administration in the main study. Separating the pilot testing from the main data collection was intended to ensure that the instrument items used in the study met the established measurement criteria.

2.3 Instruments

Research data were collected using three instruments: a self-efficacy scale, a learning motivation scale, and a learning engagement scale. At the initial stage, each scale consisted of 30 items, resulting in a total of 90 items across the three instruments. All items were presented as statements with five response alternatives using a Likert scale. The responses were scored to obtain composite scores for self-efficacy, learning motivation, and learning engagement.

2.3.1 Instrument Validity

Before being administered in the main study, all instrument items were pilot-tested with 32 students. Item validity was evaluated using the Pearson Product-Moment correlation by correlating each item score with the total instrument score. Based on the pilot sample of 32 students, the critical *r* value was 0.349. The results showed that 27 of the 30 self-efficacy items met the validity criterion. For the learning motivation scale, 27 of the 30 items met the validity criterion, while 28 of the 30 learning engagement items met the validity criterion. Thus, 82 of the 90 items met the validity criterion and were retained for data collection in the main study.

2.3.2 Instrument Reliability

Instrument reliability was assessed using Cronbach’s Alpha to evaluate the internal consistency of each scale. The results showed that the self-efficacy instrument had a Cronbach’s Alpha coefficient of 0.853, the learning motivation instrument had a coefficient of 0.836, and the learning engagement instrument had a coefficient of 0.868. These coefficients indicate good internal consistency across the three instruments used in the study.

Table 2.1
Validity Results

Variable	Initial items	Valid items	Invalid items
Self-efficacy	30	27	3
Learning motivation	30	27	3
Learning engagement	30	28	2
Total	90	82	8

2.4 Data Analysis

Data analysis was conducted in several stages. Descriptive statistics were first used to provide an overview of the data for each study variable. Pearson correlation analysis was then performed to examine the relationships among the study variables. Hypotheses were tested using multiple linear regression, with self-efficacy and learning motivation specified as the independent variables and learning engagement as the dependent variable. This analysis was used to examine the individual effects of each independent variable and their simultaneous effect on learning engagement. Before testing the proposed relationships, the suitability of the regression model was examined through a series of diagnostic procedures. These procedures addressed four potential issues: the distribution of the residuals, overlap among the predictors, unequal residual variance, and autocorrelation. Residual distribution was examined with the One-Sample Kolmogorov–Smirnov test. Potential overlap between the independent variables was evaluated using Tolerance and the Variance Inflation Factor (VIF). The presence of unequal residual variance was assessed from the corresponding significance values, whereas serial dependence was evaluated using

the Durbin–Watson statistic. The regression coefficients were evaluated individually using the t-test, while the overall significance of the regression model was determined using the F-test. Model explanatory power was represented by the coefficient of determination (R^2). A significance level of 0.05 was adopted throughout the statistical analysis. The resulting multiple linear regression equation was expressed as follows:

$$Y = a + b_1X_1 + b_2X_2 + e$$

In the equation, Y denotes the predicted learning engagement score, while a refers to the intercept. The parameters b_1 and b_2 indicate the regression coefficients associated with self-efficacy and learning motivation, respectively. The predictors are represented by X_1 (self-efficacy) and X_2 (learning motivation), whereas e denotes the residual error.

3. RESULTS

3.1 Results of Regression Assumption Tests

3.1.1 Normality Test

The residuals generated by the regression model were examined to determine whether the normality assumption was met. Using data from 62 observations, the One-Sample Kolmogorov–Smirnov procedure produced a test statistic of 0.579 and a significance value of 0.890. The obtained significance level exceeded the 0.05 criterion; therefore, the residuals did not show a significant departure from a normal distribution. On this basis, the normality requirement for the regression analysis was considered fulfilled.

3.1.2 Multicollinearity Test

Multicollinearity was assessed using the Tolerance and Variance Inflation Factor (VIF) values. The multicollinearity assessment produced identical results for the two predictors, with a Tolerance value of 0.861 and a VIF of 1.161 for both self-efficacy and learning motivation. The obtained values provide no indication of problematic multicollinearity between the independent variables, allowing both predictors to be retained in the regression model.

3.1.3 Heteroscedasticity Test

The results showed significance values of 1.000 for both self-efficacy and learning motivation. Based on these results, the regression model showed no indication of heteroscedasticity.

3.1.4 Autocorrelation Test

Autocorrelation was assessed using the Durbin–Watson statistic. The regression model yielded a Durbin–Watson value of 1.753. Based on the Durbin–Watson decision criteria for a model with two independent variables and 62 observations, this value falls within the range indicating the absence of autocorrelation.

3.2 Multiple Linear Regression Analysis

The regression model identified positive associations between both predictors and learning engagement. For self-efficacy, the unstandardized coefficient was 0.453, accompanied by a standardized β of 0.403 ($t = 4.433$, $p < 0.001$). Learning motivation yielded an unstandardized coefficient of 0.463 and a standardized β of 0.514 ($t = 5.653$, $p < 0.001$). These findings indicate that higher levels of both self-

efficacy and learning motivation were associated with higher learning engagement within the estimated model.

Table 3.1
Multiple Linear Regression Results

Predictor	B	SE	β	<i>t</i>	<i>p</i>
Constant	12.331	11.027	-	1.118	.268
<i>Self-efficacy</i>	.453	.102	.403	4.433	< .001
<i>Learning Motivation</i>	.463	.082	.514	5.653	< .001

Based on these results, the estimated multiple linear regression equation was:

$$Y = 12.331 + 0.453X_1 + 0.463X_2 + e$$

In the regression equation, *Y* denotes learning engagement, with *X*₁ and *X*₂ referring to self-efficacy and learning motivation, respectively. The term *e* accounts for the error component of the model. Both predictors were associated with positive regression coefficients. The standardized coefficient for learning motivation was higher ($\beta = 0.514$) than that obtained for self-efficacy ($\beta = 0.403$), suggesting that learning motivation made a comparatively greater contribution to the prediction of learning engagement in this model.

3.3 Simultaneous Effect Test

The regression model was statistically significant when the two predictors were considered together, with an *F* statistic of $F(2, 59) = 40.806$ and $p < 0.001$. This result supports the conclusion that self-efficacy and learning motivation jointly contributed to differences in learning engagement. The model yielded $R = 0.762$, $R^2 = 0.580$, and adjusted $R^2 = 0.566$. Accordingly, the predictors accounted for 58.0% of the observed variance in learning engagement, whereas the remaining 42.0% was not explained by the variables included in the model. The adjusted R^2 of 0.566 indicates that, after accounting for the number of predictors and the sample size, the model explained 56.6% of the variance in learning engagement. The *R*, R^2 , and adjusted R^2 values were obtained from the Model Summary.

Table 3.2
Model Fit and Simultaneous Test

Statistic	Result
<i>R</i>	.762
R^2	.580
Adjusted R^2	.566
$F(2,59)$	40.806
<i>p</i>	< .001

3.4 Partial Hypothesis Testing

3.4.1 Effect of Self-Efficacy on Learning Engagement

Self-efficacy was positively related to learning engagement in the regression model. Its unstandardized coefficient was 0.453, with a standardized β of 0.403 ($t = 4.433$, $p < 0.001$). The positive coefficient, together with the statistically significant *t* value, provides evidence that students with higher self-efficacy tended to report greater learning engagement. Accordingly, the result supports *H*₁.

3.4.2 Effect of Learning Motivation on Learning Engagement

For learning motivation, the regression coefficient was 0.463, with a standardized beta coefficient of 0.514. Learning motivation was positively

associated with learning engagement, as reflected in the t statistic of 5.653 and $p < 0.001$. The statistical evidence therefore supports a significant positive contribution of learning motivation to learning engagement. The higher standardized beta coefficient compared with that of self-efficacy indicates that, within the regression model examined in this study, learning motivation had a relatively stronger predictive contribution to learning engagement. Based on these results, H2 was supported.

3.4.3 *Simultaneous Effects of Self-Efficacy and Learning Motivation*

The simultaneous analysis showed that the regression model incorporating self-efficacy and learning motivation as predictors yielded an F(2, 59) value of 40.806, with $p < 0.001$. The joint regression model accounted for a substantial proportion of the variation in learning engagement. The analysis resulted in $R = 0.762$, $R^2 = 0.580$, and adjusted $R^2 = 0.566$. Thus, self-efficacy and learning motivation together accounted for 58.0% of the variability observed in learning engagement. The remaining 42.0% was not explained by the predictors incorporated into the present model. Based on these results, H3 was supported.

Table 4.1 Summary of hypothesis testing

Hypothesis	Statistic	p	Decision
H1: Self-efficacy → Learning engagement	t = 4.433	< .001	Supported
H2: Learning motivation → Learning engagement	t = 5.653	< .001	Supported
H3: Self-efficacy + Learning motivation → Learning engagement	F = 40.806	< .001	Supported

4. DISCUSSION

4.1 The Effect of Self-Efficacy on Learning Engagement

Students who reported stronger self-efficacy also tended to show greater engagement in learning activities. This finding indicates that students’ perceptions of their own capabilities are meaningfully related to how actively they participate in the learning process. In the present study, self-efficacy was associated with students’ willingness to take part in learning activities and remain involved in academic tasks. This finding provides support for the first hypothesis and suggests that students’ beliefs about their capabilities may play an important role in shaping their engagement during learning.

This finding can be understood from the perspective of Bandura’s social cognitive theory, which positions self-efficacy as an important mechanism underlying behavior. Beliefs about one’s capabilities are not limited to judgments of whether one is able or unable to perform a task; they also influence activity choices, the amount of effort invested, and persistence when difficulties arise. In learning contexts, students who believe they are capable of completing academic tasks may have stronger psychological grounds to persist when those tasks become challenging. Conversely, doubts about one’s capabilities may lead students to reduce their effort or avoid demands perceived as excessively difficult.

The present finding is consistent with Chen et al. (2021), who reported a positive association between academic self-efficacy and academic engagement among elementary school students. Their study also positioned academic self-efficacy as an important psychological mechanism related to students’ academic engagement. More recent evidence from Zhu et al. (2024) similarly indicates that self-efficacy constitutes an important component of students’ self-beliefs

associated with learning engagement at the elementary school level. The present findings therefore add to the empirical evidence that the relationship between students' academic beliefs and their engagement in learning can be observed during elementary education, although the characteristics of the schools and learning contexts may differ.

The finding is also consistent with the systematic literature review by Azhari and Wibowo (2025), which identified associations between self-efficacy and perseverance, independence, motivation, interest, and active engagement in learning among elementary school students. This pattern suggests that self-efficacy may not be expressed through a single form of learning behavior. Students' beliefs in their own capabilities may be reflected in their willingness to approach academic tasks, persistence in maintaining effort, and readiness to remain engaged in learning activities.

Importantly, the role of self-efficacy in the present study should also be considered in light of the developmental characteristics of elementary school students. At this stage, experiences of success and failure in completing academic tasks may contribute to the development of students' perceptions of their own capabilities. Accordingly, learning experiences that provide opportunities for attainable success, constructive feedback, and progressively challenging tasks may create conditions that support the development of academic self-efficacy. The results should therefore be considered in light of the methodological constraints inherent in the survey design adopted in this study. The regression results demonstrate a predictive relationship within the observed data and do not constitute experimental evidence of causality.

4.2 The Effect of Learning Motivation on Learning Engagement

Learning motivation emerged as a significant positive predictor of learning engagement. Students with stronger motivation to learn tended to demonstrate higher levels of engagement in learning activities. This finding supports the second hypothesis and indicates that students' motivation to learn is an important factor in explaining differences in learning engagement within the present research model.

From a psychological perspective, learning engagement requires more than students' ability to participate in instructional activities. Students also need reasons to initiate an activity, sustain their attention, complete tasks, and continue exerting effort when difficulties arise. Motivation provides energy and direction for these activities. When students possess stronger motivation to learn, learning activities may be perceived as having greater value or clearer purpose, thereby increasing the likelihood that they will sustain their engagement in the learning process.

A comparable pattern was reported by Hidayatullah et al. (2024) among 660 fifth- and sixth-grade students in Surabaya. Their study demonstrated relationships among motivation, self-efficacy, and behavioral engagement and found that motivation contributed to explaining students' behavioral engagement. These findings provide empirical support for viewing motivation as an important psychological factor associated with students' involvement in learning activities.

The present finding is also consistent with Woo and Song (2022), who studied 1,094 elementary school students and found that learning motivation and academic self-efficacy were positively associated with learning immersion. Although the concept of learning immersion is not entirely synonymous with learning engagement, both concepts reflect students' deeper involvement in the

learning process. The present study extends this pattern of findings by examining learning engagement as the dependent variable in a regression model that includes self-efficacy and learning motivation simultaneously.

The relatively larger coefficient for learning motivation in the present study is also. The findings also suggest that learning motivation made an important contribution to learning engagement when examined alongside self-efficacy. This pattern indicates that students' engagement may be related not only to their beliefs about their capabilities but also to the motivation that directs and sustains their involvement in learning activities. However, this finding should be understood within the specific context and research model of the present study rather than as evidence that motivation is the sole or most decisive factor underlying students' learning engagement.

4.3 The Joint Effect of Self-Efficacy and Learning Motivation on Learning Engagement

When self-efficacy and learning motivation were examined simultaneously, both variables were significantly associated with students' learning engagement. This finding supports the third hypothesis and suggests that learning engagement can be understood through the combined contribution of students' beliefs in their own capabilities and their motivation to learn.

The findings indicate that self-efficacy and learning motivation occupy complementary positions within the research model. Self-efficacy concerns students' beliefs about their ability to meet learning demands, whereas motivation concerns the psychological drive that directs and sustains learning activities. A student may possess adequate abilities but may not engage optimally in learning when motivation is low. Conversely, strong motivation to learn may encounter obstacles when students lack confidence in their ability to meet academic demands. From this perspective, the two variables offer distinct yet interconnected perspectives for understanding students' learning engagement.

The present findings show a close resemblance to those of Muslimin et al. (2026), who likewise examined self-efficacy and learning motivation as predictors of learning engagement among elementary school students using multiple linear regression. Their study reported significant effects of both variables, both individually and simultaneously, with an R^2 of 0.531. The present study yielded a higher R^2 of 0.580, providing additional empirical evidence regarding the capacity of these two constructs to explain variation in learning engagement. However, the difference in R^2 should not be interpreted as evidence that one study is superior to the other, as differences in student characteristics, school environments, instruments, and research contexts may contribute to variations in the explanatory power of the models.

This comparison further positions the present study as a replication and extension of existing empirical evidence. Whereas Muslimin et al. (2026) involved 50 students, the present study involved 62 fourth-grade students in a different educational setting. The finding that a positive pattern of relationships among self-efficacy, learning motivation, and learning engagement was also observed in the present context provides additional evidence from a different group of elementary school students. Such consistency across research contexts strengthens the empirical basis for considering both psychological constructs when examining learning engagement among elementary school students.

4.4 Educational Psychology Implications

From an educational psychology perspective, the findings suggest that efforts to enhance learning engagement should not be directed solely toward changes in instructional strategies. Students' psychological conditions also warrant attention, particularly their beliefs in their own capabilities and their motivation to learn. Because both factors demonstrated significant predictive relationships with learning engagement in the present study, learning environments should provide opportunities for the development of these psychological resources.

A practical implication is the importance of providing learning experiences through which students can recognize tangible progress and experience attainable success. Tasks can be structured progressively according to students' levels of ability and accompanied by constructive feedback that helps them recognize the progress they have made. At the same time, instruction should provide clear learning goals and activities that students perceive as meaningful, so that their motivation to learn is not dependent solely on external rewards or pressure.

The findings also highlight the importance of teachers in creating classroom conditions in which students feel capable while remaining motivated to participate. Previous research involving elementary school students has shown that self-efficacy is associated with various forms of learning behavior, including persistence and active engagement. Accordingly, strengthening self-efficacy and learning motivation may be considered part of broader efforts to foster more consistent learning engagement.

However, the R^2 value of 0.580 also indicates that 42.0% of the variance in learning engagement remained unexplained by the two variables included in the model. Learning engagement therefore cannot be reduced solely to self-efficacy and motivation. Other factors, including teacher support, peer relationships, the learning environment, family circumstances, instructional characteristics, and other individual factors, may also contribute to students' engagement. Future research could therefore extend the present model by incorporating these factors, using larger samples, and involving students from multiple schools.

5. CONCLUSION

All three hypotheses were supported by the statistical results. Self-efficacy was a significant positive predictor of learning engagement ($B = 0.453$, $\beta = 0.403$, $t = 4.433$, $p < 0.001$), while learning motivation showed a similar positive and significant association ($B = 0.463$, $\beta = 0.514$, $t = 5.653$, $p < 0.001$). When the two predictors were entered into the regression model together, the model was statistically significant, $F(2, 59) = 40.806$, $p < 0.001$, with $R^2 = 0.580$. Thus, the combined predictors accounted for 58.0% of the variation in students' learning engagement. Within the present sample, greater self-efficacy and stronger learning motivation were associated with higher levels of learning engagement.

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8. DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Requests for access to the data may be submitted via the corresponding author's email, subject to applicable ethical, privacy, and confidentiality considerations.

9. AUTHORS' CONTRIBUTIONS STATEMENT

Sainudin Mahyudin contributed to the conceptualization of the study, development of the research methodology, coordination and implementation of the research, data collection and processing, statistical analysis, interpretation of the findings, manuscript preparation, and final revision. The second author contributed to the development of the conceptual framework, literature review, methodological review, and substantive revision of the manuscript. The third author contributed to academic supervision, critical review and interpretation of the research findings, and revision and refinement of the manuscript. All authors reviewed and approved the final version of the manuscript.

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