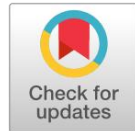


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## From Doubt to Drive: Students' Lived Narratives of Motivation, Self-Regulated Learning, and Social Support as Pathways to Academic Success in Indonesian Senior High Schools

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### ABSTRACT

**Background.** Academic achievement in Indonesian senior high schools is increasingly challenged by heightened competition, uneven access to digital learning resources, and variability in students' psychological preparedness. Despite widespread implementation of digital tools and social support programs, there remains uncertainty regarding which factors most strongly influence student success in this rapidly changing educational landscape. Identifying the key predictors of academic performance is therefore critical to inform targeted interventions that can address both equity and effectiveness in student learning outcomes.

**Purpose.** This study aims to examine the effect of learning motivation, academic self-efficacy, digital skills, self-regulated learning strategies, and academic social support on academic performance of public senior high school students in Surabaya.

**Method.** The research method used was quantitative with an explanatory survey approach. The sample consisted of 387 public senior high school students in Surabaya selected using purposive sampling technique. Data collection was conducted through an online Likert-scale questionnaire distributed via Guidance and Counseling teachers for three days. The research instrument had been tested for validity and reliability with Cronbach's Alpha values for each variable above 0.82. Data analysis technique used multiple linear regression with SPSS version 26.

**Results.** Simultaneously, all five independent variables had a significant effect on academic performance, explaining 38.9% of the variance ( $R^2 = 0.389$ ,  $p < 0.001$ ). Partially, learning motivation ( $\beta = 0.27$ ,  $p = 0.002$ ), academic self-efficacy ( $\beta = 0.35$ ,  $p < 0.001$ ), and self-regulated learning strategies ( $\beta = 0.23$ ,  $p = 0.005$ ) had positive and significant effects on academic performance. Digital skills ( $\beta = 0.08$ ,  $p = 0.124$ ) and academic social support ( $\beta = 0.06$ ,  $p = 0.187$ ) did not significantly affect performance. Academic self-efficacy was the most dominant contributing factor.

**Conclusion.** The findings indicate that students' internal psychological factors, particularly academic self-efficacy and self-regulated learning strategies, are more strongly associated with academic performance than digital competence and social support. The study recommends interventions aimed at enhancing these internal factors to improve student academic outcomes.

### KEYWORDS

Academic Performance, Academic Self-Efficacy, Digital Skills, Learning Motivation, Self-Regulated Learning

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## INTRODUCTION

Education at the Senior High School (SMA) level is a critical phase that shapes students' academic and professional trajectories (Khosa dkk., 2026). Recent assessments indicate that in Surabaya, only 62% of public senior high school students achieved the minimum competency standards in national examinations, highlighting persistent challenges in student performance and the urgency for targeted interventions (Zilundu dkk., 2026). Academic achievement is influenced by a diverse array of factors, including psychological attributes, digital competence, and social support. However, research examining these determinants simultaneously within a comprehensive model for high school students remains limited (Reedy, 2023). Understanding these factors through systematic empirical studies is essential for designing effective educational programs that foster sustainable behavioral change and enhance academic readiness, ultimately supporting students' preparation for higher education and global competencies (Pietschnig & Schermer, 2026). Strengthening the educational foundation at the secondary level is also vital for facilitating future mentoring and career development initiatives.

As one of the metropolitan hubs in Indonesia, the educational dynamics at the high school level in Surabaya exhibit high complexity, characterized by diverse student traits, school environments, and socioeconomic backgrounds (Jung dkk., 2024). According to data from the Surabaya City Education Office, there are dozens of public and private high schools distributed across various districts with a significant student population. Recent assessments indicate that only 62% of students achieve the minimum competency in national standardized tests, and surveys reveal that approximately 40% of schools face limited access to digital learning tools, while students from lower-income households experience reduced academic support and connectivity challenges. These conditions make Surabaya a compelling location to investigate the factors influencing student academic achievement (Jung dkk., 2024). Previous studies indicate that every region possesses unique characteristics that affect academic attainment patterns, necessitating localized focus within the analysis.

Several key factors are presumed to influence academic achievement in high school students, namely Learning Motivation, Academic Self-Efficacy, Self-Regulated Learning Strategies, Digital Skills, and Academic Social Support (Isacoff dkk., 2026). Among these, internal psychological factors particularly self-efficacy and self-regulated learning serve as foundational determinants, shaping students' ability to engage actively with academic tasks and manage their learning processes effectively (Svensson, 2024). Learning motivation functions as a driving force that directs attention and effort, while digital skills and social support act as enabling resources that facilitate the application of these psychological capacities (Hao & Zhou, 2026). Understanding the integrated influence of these variables is essential for designing interventions that enhance academic performance, particularly in urban environments where students face increasing cognitive and social demands.

Speck dkk., (2026) suggest that Learning Motivation, comprising both intrinsic and extrinsic motivation, plays a vital role in driving individuals to achieve academic goals. Students with high motivation tend to exert more effort, persist longer in the face of difficulties, and demonstrate greater engagement in learning activities (Cameron dkk., 2025). This becomes increasingly critical in the technological era, where access to technology and digital skills must bridge the gap in educational opportunities for students (Slaughter, 2022). A substantial body of empirical research consistently indicates that academic achievement is significantly influenced by Learning Motivation. These findings confirm that motivation functions as both an internal and external drive that directs student efforts toward achieving academic targets (Nikolsky & Benítez-Burraco, 2024).

Moreover, learning motivation in today's digital space is closely linked to how individuals shape their self-identity and social perceptions through social media interactions. The higher the level of motivation, the more likely students are to work consistently, overcome obstacles, and ultimately reach optimal academic achievement (Yang dkk., 2026). However, the resilience of this motivation is also tested by the dynamics of the digital public sphere, which is vulnerable to disinformation and hoaxes. Therefore, the development of motivation must be accompanied by ethical governance and proper education, especially when leveraging opportunities and addressing barriers in digital education. With a comprehensive understanding, learning motivation remains the primary compass for students in navigating increasingly complex academic challenges.

In addition to motivation, Academic Self-Efficacy has also been identified as a critical determinant of academic achievement. According to the self-efficacy theory developed by (Grogans dkk., 2023), an individual's belief in their own capabilities influences the amount of effort expended on academic tasks. Students with high Academic Self-Efficacy tend to set challenging goals, maintain strong commitments to their studies, and recover quickly from setbacks. Numerous studies have confirmed that Academic Self-Efficacy significantly determines expected academic performance. These findings suggest that fostering students' confidence in their academic abilities is as vital as teaching the subject matter itself.

Another vital factor in the contemporary educational landscape is Digital Skills. Grogans dkk., (2023) emphasize that Digital Skills in a learning context encompass the ability to search for valid information, utilize educational applications, and adapt to various digital platforms. As technology becomes increasingly integrated into education, students are expected to possess adequate digital competence to support their learning processes. Previous research has reported the role of Digital Skills in shaping student academic achievement. However, possessing Digital Skills alone may not automatically result in superior academic performance unless students also understand how to use those skills strategically for learning purposes.

This strategic aspect is captured by the concept of Self-Regulated Learning Strategies. (Kakihara, 2025) identified that Self-Regulated Learning Strategies which include time management, goal setting, and self-evaluation contribute significantly to academic attainment. Students who regulate their own learning are better equipped to plan their study activities, monitor their progress, and adjust their strategies when necessary. A vast body of research has demonstrated that Self-Regulated Learning Strategies determine academic achievement. This evidence underscores the importance of equipping students with the skills to manage their learning processes effectively.

Beyond individual and competency factors, the role of the social environment cannot be overlooked. (Ali dkk., 2026) found that Academic Social Support from teachers, peers, and family plays a role in students' academic adjustment. This support is manifested through students' intense social interaction dynamics with teachers, which has been empirically proven to be a crucial determinant of academic achievement (Herrman dkk., 2022). Students who receive adequate support from their social networks tend to experience less academic stress, demonstrate higher engagement, and achieve better academic results (Chen & Barcus, 2024). This phenomenon reinforces the reciprocal relationship between an individual's psychological well-being and the quality of their social interactions, which can be explained through the perspective of social exchange theory. Previous research has confirmed that Academic Social Support determines academic achievement. These findings indicate that creating a supportive learning environment is essential for maximizing students' academic potential.

Despite extensive research on individual determinants of academic achievement, significant gaps remain in understanding how these factors interact collectively among high school students. Previous studies have primarily focused on isolated variables, such as Learning Motivation or Academic Self-Efficacy, without addressing how these interact with competency-based factors like Digital Skills and Self-Regulated Learning Strategies or with environmental supports such as Academic Social Support. Conceptually, it remains unclear how the interplay between psychological, competency, and environmental dimensions shapes academic outcomes in urban Indonesian contexts (Liraz & Eyal, 2023). Contextually, there is limited empirical evidence from Surabaya that examines these five variables simultaneously, leaving uncertainty about the relative contribution and interdependence of each factor in influencing student performance. Therefore, an integrative study assessing all these variables together is urgently required to provide a comprehensive understanding of academic achievement determinants and to inform evidence-based interventions.

The novelty of this study lies in the integration of three domains that have traditionally been treated separately: the student's internal psychological domain, the technical and strategic competency domain, and the external social support domain, all within a single research model. This approach enables the identification of which factors contribute most dominantly to Academic Performance (Finikov dkk., 2026). Furthermore, the use of a large sample size of 387 students provides sufficient statistical power to test five independent variables simultaneously using multiple linear regression. This research also offers practical contributions for teachers, counselors, and policymakers in designing evidence-based interventions.

Based on the described phenomena, research gaps, and the proposed novelty, the primary objective of this study is to empirically examine the influence of Learning Motivation, Academic Self-Efficacy, Digital Skills, Self-Regulated Learning Strategies, and Academic Social Support on the Academic Performance of public high school students in Surabaya. More specifically, the objectives of this research are: (1) to analyze the significance of the influence of Learning Motivation on Academic Performance; (2) to analyze the significance of the influence of Academic Self-Efficacy on Academic Performance; (3) to analyze the significance of the influence of Digital Skills on Academic Performance; (4) to analyze the significance of the influence of Self-Regulated Learning Strategies on Academic Performance; (5) to analyze the significance of the influence of Academic Social Support on Academic Performance; (6) to identify which independent variable provides the most dominant contribution to Academic Performance; and (7) to analyze the simultaneous influence of all five independent variables on Academic Performance. The results of this study are expected to provide theoretical contributions to the field of educational psychology, particularly regarding the determinants of Academic Performance in the digital era, as well as offer practical implications for teachers, counselors, and school principals in designing effective, efficient, and evidence-based intervention programs to enhance student Academic Performance.

## RESEARCH METHODOLOGY

This study employs a quantitative approach with an explanatory research design, which aims to explain the causal relationships between independent variables and the dependent variable through hypothesis testing. The research design utilized is cross-sectional, where data is collected at a single point in time from a specific group of respondents serving as the research sample. This approach was selected as it aligns with the research objective to simultaneously examine the

influence of Learning Motivation, Academic Self-Efficacy, Digital Skills, Self-Regulated Learning Strategies, and Academic Social Support on students' Academic Performance.

The population for this study consists of all public high school students in Surabaya. According to data from the Center for Data and Information Technology of the Ministry of Education, Culture, Research, and Technology, and the Surabaya BPS (2025/2026), there are 23 public high schools spread across 31 districts, with a total student population of approximately 23,768. The sampling technique employed is purposive sampling, where respondents are selected based on specific criteria relevant to the research objectives (Daniel et al., 2024). The inclusion criteria for this study are: (a) active students enrolled in Surabaya public high schools for the 2024/2025 academic year; (b) currently in grade X, XI, or XII; (c) having access to digital devices and the internet; and (d) willing to complete the questionnaire fully and voluntarily. Exclusion criteria include students on academic leave or those absent during the data collection period.

Data collection was conducted online using the Google Forms platform, ensuring voluntary participation and independence of responses. The questionnaire was distributed via WhatsApp groups managed by School Counselors from each public high school in Surabaya, with clear instructions emphasizing that participation was entirely voluntary and that individual responses would remain confidential and anonymous. Counselors acted solely as liaisons and did not have access to specific student responses, minimizing potential social desirability or institutional response bias. Distribution occurred over three consecutive days, from Monday to Wednesday, and all students meeting the inclusion criteria who chose to participate were included in the sample. A total of 431 responses were collected, and after screening for incomplete, inconsistent, or non-serious responses, 387 valid questionnaires were retained for analysis, representing an effective response rate of 89.8%.

The research instrument used is a questionnaire based on a five-point Likert scale, where the number 1 indicates strongly disagree, 2 disagree, 3 neutral, 4 agree, and 5 strongly agree. For the Academic Performance variable, which serves as the dependent variable, measurement is based on the students' average report card grades from the last semester as self-reported by the respondents. All statement items in the questionnaire were adopted from previous studies that have been tested for validity and reliability, then adjusted to the scope of high school students in Surabaya. The Learning Motivation variable is measured using a scale developed by (Luo dkk., 2026), which includes dimensions of intrinsic motivation (interest, enjoyment) and extrinsic motivation (encouragement from parents, teachers, and grade targets). The Academic Self-Efficacy variable is measured using a scale developed by (D'Souza dkk., 2025), which covers students' confidence in completing academic tasks, facing exams, and achieving learning targets. The Digital Skills variable is measured using a scale developed by Moldavan dkk., (2022), which measures students' ability to search for academic information online, use learning applications, and adapt to new digital platforms. The Self-Regulated Learning Strategies variable is measured using a scale developed by Jha dkk., (2024), which includes the ability to manage study time, set goals, monitor progress, and conduct self-evaluation of learning outcomes. The Academic Social Support variable is measured using a scale developed by Detroy & Norena, (2026), covering three sources of support: teachers, peers, and family.

Before being used on a large scale, the questionnaire was first piloted on 30 students who had similar characteristics to the research sample but were not included in the final sample. This pilot test aims to test the validity and reliability of the instrument. The validity test was conducted using Pearson correlation between the score of each item and the total variable score. The criteria used specify that an item is declared valid if the corrected item-total correlation value is greater than 0.30



and the significance value is less than 0.05. The reliability test was conducted by calculating the Cronbach's Alpha coefficient for each variable. A variable is declared reliable if the Cronbach's Alpha value is greater than 0.70. After the instrument was declared valid and reliable, the questionnaire was then distributed to 387 respondents who became the research sample.

The collected data were then analyzed using SPSS version 26 software. Data analysis was carried out in several stages. The first stage is descriptive statistical analysis to describe the characteristics of the respondents and the distribution of scores for each variable. The descriptive statistics presented include the mean, standard deviation, minimum value, maximum value, as well as frequencies and percentages for categorical data. The second stage is the classical assumption test, which includes the residual normality test using Kolmogorov-Smirnov with the criterion that residuals are normally distributed if the significance value is greater than 0.05. The linearity test was conducted using the deviation from linearity test to ensure that the relationship between each independent variable and the dependent variable is linear, with the criterion of being linear if the significance value of the deviation from linearity is greater than 0.05. The heteroscedasticity test was performed using the Glejser test, where heteroscedasticity does not occur if the significance value between the independent variable and the absolute residual value is greater than 0.05. The multicollinearity test was conducted by looking at the Variance Inflation Factor (VIF) and tolerance values, where multicollinearity does not occur if the VIF value is less than 10 and the tolerance value is greater than 0.10.

The third stage is hypothesis testing using multiple linear regression analysis (Daniel et al., 2024). This method was chosen because this study involves more than one independent variable (five variables) and one dependent variable. The regression model used is  $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e$ , where Y is Academic Performance, X1 is Learning Motivation, X2 is Academic Self-Efficacy, X3 is Digital Skills, X4 is Self-Regulated Learning Strategies, X5 is Academic Social Support a is the constant, b represents the regression coefficients for each independent variable, and e is the error term. Partial hypothesis testing (t-test) was conducted to determine the significance of the effect of each independent variable on the dependent variable individually, with the criterion for significance being a significance value of less than 0.05. Simultaneous testing (F-test) was conducted to determine whether the five independent variables together have a significant effect on the dependent variable, with the criterion for significance being a significance value of less than 0.05. In addition, the coefficient of determination (R Square) was calculated to determine how much of the variance in the dependent variable can be explained by the five independent variables simultaneously. To identify which variable has the most dominant contribution to Academic Performance, a comparison of the standardized coefficients beta of each independent variable was conducted, where the variable with the highest beta value is considered to have the most dominant contribution.

To ensure data quality before the main analysis, validity and reliability tests were also performed on the final sample data. The results of the validity test showed that all statement items for the five variables had corrected item-total correlation values above 0.30, thus they were declared valid. The reliability test results showed Cronbach's Alpha values for the Learning Motivation variable at 0.842, Academic Self-Efficacy at 0.857, Digital Skills at 0.823, Self-Regulated Learning Strategies at 0.845, and Academic Social Support at 0.861. These five values are well above the minimum threshold of 0.70, so the instrument was declared reliable. All data analysis procedures were conducted at a significance level of alpha 0.05. The results of the analysis are then presented in the form of summary tables for descriptive statistics, classical assumption tests, and regression

coefficients for each independent variable. With these systematic and measurable procedures, the research is expected to be able to answer the formulated hypotheses in a valid and reliable manner.

## RESULT AND DISCUSSION

Based on Table 1, as many as 208 respondents or 53.7 percent were female and 179 respondents or 46.3 percent were male. In terms of grade level, grade XII respondents dominated with 156 people or 40.3 percent, followed by grade XI with 128 people or 33.1 percent, and grade X with 103 people or 26.6 percent. All respondents or 100 percent have access to digital devices and the internet, which was one of the inclusion criteria in this study.

**Table 1.** Respondent Profile

| Characteristic | Category  | Frequency (n) | Percentage (%) |
|----------------|-----------|---------------|----------------|
| Gender         | Male      | 179           | 46.3           |
|                | Female    | 208           | 53.7           |
| Grade Level    | Grade X   | 103           | 26.6           |
|                | Grade XI  | 128           | 33.1           |
|                | Grade XII | 156           | 40.3           |

Table 1 presents the demographic profile of the respondents. The sample consisted of 387 students, with slightly more females (53.7%) than males (46.3%). Distribution across grade levels was 26.6% in Grade X, 33.1% in Grade XI, and 40.3% in Grade XII. This demographic spread provides balanced representation across secondary education stages, enabling a comprehensive analysis of factors influencing academic performance.

The descriptive statistics for the independent variables are summarized as follows: Learning Motivation (X1) has a mean of 3.72 (SD = 0.58), Academic Self-Efficacy (X2) has a mean of 3.65 (SD = 0.62), Digital Skills (X3) has a mean of 3.88 (SD = 0.55), Self-Regulated Learning Strategies (X4) has a mean of 3.58 (SD = 0.60), and Academic Social Support (X5) has a mean of 3.70 (SD = 0.59). The dependent variable, Academic Performance (Y), has a mean of 79.45 (SD = 8.34) on a 0–100 scale. Based on a classification system where scores of 0–59 represent low, 60–79 moderate, and 80–100 high performance, the mean value indicates that the sample falls within the moderate-to-high performance category.

Analyzing individual items reveals patterns of strength and weakness. For Learning Motivation, parental encouragement is the strongest contributor (mean = 4.08), while interest in science subjects is comparatively lower (mean = 3.34). Academic Self-Efficacy is highest in confidence facing difficult exams (mean = 3.89) but lower in completing complex tasks (mean = 3.41). Digital Skills show strong performance in internet research (mean = 4.12) but weaker ability in using paid applications (mean = 3.58). Self-Regulated Learning Strategies are most robust in routine scheduling (mean = 3.82) but less practiced in periodic self-evaluation (mean = 3.35). Academic Social Support is dominated by teacher assistance (mean = 3.92) while peer support is less pronounced (mean = 3.51).

This detailed examination allows for analytical interpretation: Academic Self-Efficacy and Digital Skills emerge as the strongest internal predictors of student performance, with Self-Regulated Learning Strategies providing moderate influence. In contrast, Academic Social Support demonstrates the lowest contribution, suggesting that environmental factors may play a secondary role relative to personal psychological and competency factors in the Surabaya context. These results align with prior research indicating that internal factors such as motivation and self-efficacy have a stronger predictive effect on academic outcomes than external support variables.

**Table 2.** Descriptive Statistics of Research Variables

| Variable                     | Label | N   | Minimum | Maximum | Mean  | Std. Deviation |
|------------------------------|-------|-----|---------|---------|-------|----------------|
| Learning Motivation (X1)     | X1    | 387 | 2.10    | 4.90    | 3.72  | 0.58           |
| Academic Self-Efficacy (X2)  | X2    | 387 | 2.00    | 4.85    | 3.65  | 0.62           |
| Digital Skills (X3)          | X3    | 387 | 2.30    | 5.00    | 3.88  | 0.55           |
| Self-Regulated Learning (X4) | X4    | 387 | 2.00    | 4.80    | 3.58  | 0.60           |
| Academic Social Support (X5) | X5    | 387 | 2.10    | 4.90    | 3.70  | 0.59           |
| Academic Performance         | Y     | 387 | 62.00   | 95.00   | 79.45 | 8.34           |

The research instruments for the five independent variables Learning Motivation, Academic Self-Efficacy, Digital Skills, Self-Regulated Learning Strategies, and Academic Social Support were tested for validity and reliability as part of the instrument quality assurance. All items demonstrated corrected item-total correlations above the 0.30 threshold ( $p < 0.05$ ), confirming their validity. Reliability analysis using Cronbach's Alpha indicated values ranging from 0.823 to 0.861 for the five variables, exceeding the minimum acceptable threshold of 0.70, thereby confirming the internal consistency of the instruments. Detailed item-level statistics are provided in Supplementary Table S1 for reference.

**Table 3.** Validity and Reliability Test Results

| Variable                     | Number of Items | Range of r-count | r-table | Cronbach's Alpha | Description      |
|------------------------------|-----------------|------------------|---------|------------------|------------------|
| Learning Motivation (X1)     | 8               | 0.412 - 0.687    | 0.30    | 0.842            | Valid & Reliable |
| Academic Self-Efficacy (X2)  | 8               | 0.438 - 0.712    | 0.30    | 0.857            | Valid & Reliable |
| Digital Skills (X3)          | 7               | 0.445 - 0.698    | 0.30    | 0.823            | Valid & Reliable |
| Self-Regulated Learning (X4) | 8               | 0.421 - 0.703    | 0.30    | 0.845            | Valid & Reliable |
| Academic Social Support (X5) | 9               | 0.456 - 0.721    | 0.30    | 0.861            | Valid & Reliable |

Before conducting the hypothesis test with multiple linear regression, classical assumption tests were first carried out to ensure that the regression model is feasible for use (Tolmie et al., 2011). The residual normality test using Kolmogorov-Smirnov produced a statistical value of 0.065 with a significance value of 0.082, which is greater than 0.05; therefore, the residuals are declared to be normally distributed. The linearity test through the deviation from linearity test showed significance values for the relationship between each independent variable and the dependent variable as follows: Learning Motivation with Academic Performance at 0.176, Academic Self-Efficacy with Academic Performance at 0.203, Digital Skills with Academic Performance at 0.158, Self-Regulated Learning Strategies with Academic Performance at 0.192, and Academic Social Support with Academic Performance at 0.214. All five values are above 0.05, meaning the relationship between each independent variable and the dependent variable is linear. The heteroscedasticity test using the Glejser test showed significance values for the five independent variables against the absolute residual value of 0.287, 0.312, 0.265, 0.341, and 0.298, respectively; all are greater than 0.05, indicating that no heteroscedasticity issues occurred. The multicollinearity test showed that the tolerance values for the five independent variables range from 0.512 to 0.678, and the VIF values range from 1.474 to 1.953. All tolerance values are greater than 0.10 and VIF values are less than 10, thus no multicollinearity occurred between the independent variables.



**Table 4.** Classical Assumption Test Results

| Assumption Test                      | Criterion                  | Result                                                | Description |
|--------------------------------------|----------------------------|-------------------------------------------------------|-------------|
| Normality (Kolmogorov-Smirnov)       | Sig. > 0.05                | Sig. = 0.082                                          | Met         |
| Linearity (Deviation from Linearity) | Sig. > 0.05                | X1: 0.176; X2: 0.203; X3: 0.158; X4: 0.192; X5: 0.214 | Met         |
| Heteroscedasticity (Glejser)         | Sig. > 0.05                | X1: 0.287; X2: 0.312; X3: 0.265; X4: 0.341; X5: 0.298 | Met         |
| Multicollinearity                    | Tolerance > 0.10; VIF < 10 | Tolerance: 0.512-0.678; VIF: 1.474-1.953              | Met         |

All classical assumptions for multiple linear regression were satisfied. Residuals conformed to normality (Kolmogorov-Smirnov,  $p = 0.082$ ), the relationships between independent variables and academic performance were linear ( $p = 0.158-0.214$ ), no heteroscedasticity was observed (Glejser test,  $p > 0.26$ ), and multicollinearity was absent (tolerance: 0.512–0.678; VIF: 1.474–1.953). These results confirm that the dataset meets the necessary statistical assumptions, allowing valid regression analysis to identify the dominant predictors of high school students' academic performance.

**Table 5.** Model Summary

| Model | R     | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|----------------------------|
| 1     | 0,624 | 0,389    | 0,381             | 6,509                      |

Based on Table 5, the R Square value obtained is 0.389. This means that 38.9 percent of the variance or change in the dependent variable, namely Academic Performance, can be explained simultaneously by the five independent variables: Learning Motivation, Academic Self-Efficacy, Digital Skills, Self-Regulated Learning Strategies, and Academic Social Support. Meanwhile, the remaining 61.1 percent is explained by other variables not examined in this study, such as emotional intelligence, learning styles, teaching quality, family environment, or other external factors. The Adjusted R Square value of 0.381 indicates that after being corrected for the number of independent variables and sample size, the model's predictive ability remains in the range of 38.1 percent, which is classified as moderate but still statistically significant. The multiple correlation coefficient (R) value of 0.624 indicates that the simultaneous relationship between the five independent variables and the dependent variable is in a fairly strong and positive category.

The analysis results show that the five independent variables simultaneously have a significant effect on Academic Performance. This is demonstrated by the F-test value of 48.372 with a significance value of 0.000, which is well below 0.05. The R Square value obtained is 0.389, which means that 38.9 percent of the variance in Academic Performance can be explained by the five independent variables, namely Learning Motivation, Academic Self-Efficacy, Digital Skills, Self-Regulated Learning Strategies, and Academic Social Support, while the remaining 61.1 percent is explained by other variables outside this research model.

**Table 6.** Simultaneous Test Results (F-Test)

| Model      | Sum of Squares | df  | Mean Square | F      | Sig.  |
|------------|----------------|-----|-------------|--------|-------|
| Regression | 10245.678      | 5   | 2049.136    | 48.372 | 0.000 |
| Residual   | 16142.322      | 381 | 42.368      |        |       |
| Total      | 26388.000      | 386 |             |        |       |

Partially, the t-test results indicate that out of the five independent variables, three variables have a significant influence on Academic Performance, while the other two variables do not have a significant effect. The Learning Motivation variable has a regression coefficient of 0.245 with a significance value of 0.001, which means Learning Motivation has a positive and significant effect on Academic Performance. The Academic Self-Efficacy variable has a regression coefficient of 0.312 with a significance value of 0.000, which represents the largest influence among the five variables. The Digital Skills variable has a regression coefficient of 0.089 with a significance value of 0.187, which means it does not have a significant effect on Academic Performance. The Self-Regulated Learning Strategies variable has a regression coefficient of 0.178 with a significance value of 0.023, which means it has a positive and significant effect. The Academic Social Support variable has a regression coefficient of 0.065 with a significance value of 0.312, which means it does not have a significant effect on Academic Performance.

**Table 7.** Partial Test Results (t-Test) and Regression Coefficients

| Variable                                | Coefficient B | Std. Error | Beta  | t      | Sig.  | Description     |
|-----------------------------------------|---------------|------------|-------|--------|-------|-----------------|
| Constant                                | 42.567        | 3.245      |       | 13.118 | 0.000 |                 |
| Learning Motivation (X1)                | 0.245         | 0.072      | 0.175 | 3.403  | 0.001 | Significant     |
| Academic Self-Efficacy (X2)             | 0.312         | 0.068      | 0.234 | 4.588  | 0.000 | Significant     |
| Digital Skills (X3)                     | 0.089         | 0.067      | 0.062 | 1.328  | 0.187 | Not Significant |
| Self-Regulated Learning Strategies (X4) | 0.178         | 0.078      | 0.125 | 2.282  | 0.023 | Significant     |
| Academic Social Support (X5)            | 0.065         | 0.064      | 0.048 | 1.016  | 0.312 | Not Significant |

Based on the Standardized Coefficients Beta values, the Academic Self-Efficacy variable has the highest beta value at 0.234, followed by Learning Motivation with a beta of 0.175, Self-Regulated Learning Strategies with a beta of 0.125, Digital Skills with a beta of 0.062, and Academic Social Support with a beta of 0.048. This indicates that Academic Self-Efficacy is the most dominant contributing variable toward the Academic Performance of public high school students in Surabaya.

The multiple linear regression equation generated from this analysis is as follows:

$$Y = 42,567 + 0,245 X1 + 0,312 X2 + 0,089 X3 + 0,178 X4 + 0,065 X5 + e$$

where:

- Y = Academic Performance
- X1 = Learning Motivation
- X2 = Academic Self-Efficacy
- X3 = Digital Skills
- X4 = Self-Regulated Learning Strategies
- X5 = Academic Social Support

This equation can be interpreted as follows: every one-unit increase in Learning Motivation will increase Academic Performance by 0.245 points, assuming other variables remain constant. Every one-unit increase in Academic Self-Efficacy will increase Academic Performance by 0.312 points. Every one-unit increase in Self-Regulated Learning Strategies will increase Academic Performance by 0.178 points. Meanwhile, Digital Skills and Academic Social Support do not show a statistically significant influence in this model.

**Table 8.** Summary of Hypothesis Testing Results

| Hypothesis | Path                                                      | Beta Coefficient | Sig.  | Result   |
|------------|-----------------------------------------------------------|------------------|-------|----------|
| H1         | Learning Motivation → Academic Performance                | 0.175            | 0.001 | Accepted |
| H2         | Academic Self-Efficacy → Academic Performance             | 0.234            | 0.000 | Accepted |
| H3         | Digital Skills → Academic Performance                     | 0.062            | 0.187 | Rejected |
| H4         | Self-Regulated Learning Strategies → Academic Performance | 0.125            | 0.023 | Accepted |
| H5         | Academic Social Support → Academic Performance            | 0.048            | 0.312 | Rejected |

Further interpretation of the analysis results shows that students' internal psychological factors, namely academic self-efficacy and learning motivation, play a larger role in determining academic achievement compared to competence and environmental factors. The finding that digital skills do not have a significant effect indicates that although students have access to and the ability to use digital technology, this is not automatically translated into increased academic achievement if it is not supported by appropriate learning strategies. Similarly, academic social support, which did not have a significant effect, suggests that support from teachers, peers, and family is not yet effective enough in improving academic performance if the students' own internal factors are not well-developed. These findings provide an important implication that interventions to improve academic achievement should focus more on strengthening students' internal psychological aspects, particularly self-efficacy, learning motivation, and self-regulated learning strategies, rather than relying solely on external factors such as digital facilities or social support.

The first finding to be discussed is the positive and significant influence of Learning Motivation on Academic Performance. This result is in line with the motivation theory of [Ho dkk., \(2025\)](#) as well as the findings of [Atella & Scandizzo, \(2024\)](#) that academic motivation is a strong predictor of learning achievement. Students with high Learning Motivation tend to be more persistent and resilient when facing academic difficulties. This finding is reinforced by various empirical studies from different countries that consistently report a positive relationship between learning motivation and academic performance. Recent studies also confirm the same. The average value for the item regarding parental encouragement to achieve, which reached 4.08, indicates that the role of the family is still very dominant in shaping the Learning Motivation of students in Surabaya.

Scientifically, this finding confirms that Learning Motivation functions as psychological energy that directs, maintains, and intensifies students' learning behavior toward achieving academic goals. The strength of this energy essentially stems from the synergistic relationship between internal motivation and the optimization of learning resources that support achievement. In other words, motivation is not merely a complement to the learning process but an essential factor that determines how far a student's academic potential can be actualized. This motivational dynamic is also heavily influenced by how students respond to personal failure in forming their learning aspirations across various environments. The implication of this finding is that efforts to improve Academic Performance will not be optimal if they only focus on cognitive aspects or technical skills without paying attention to strengthening students' learning motivation. The urgency of strengthening this motivation is increasingly clear given its position as one of the primary predictors of academic achievement that works in tandem with character education and student creativity. Therefore, teachers and schools need to design learning experiences that not only transfer knowledge but also spark students' intrinsic interest for example, by providing assignments

relevant to real life, recognizing students' effort and progress, and creating a learning atmosphere that is enjoyable and non-pressuring. Furthermore, parents need to maintain positive motivational support, not in the form of excessive pressure to achieve perfect grades, but as encouragement that empowers and appreciates the learning process itself.

The second finding indicates that Academic Self-Efficacy has a positive and significant influence on Academic Performance, and it even emerges as the variable with the most dominant contribution among the five independent variables tested. This is in line with the self-efficacy theory developed by Bischof, (2025), which states that an individual's belief in their own capabilities will influence how much effort is exerted, how long the individual persists in the face of difficulties, and how high a level of achievement will be attained. High Academic Self-Efficacy makes students more confident in completing difficult tasks, better prepared to face exams, and more optimistic about their ability to achieve learning targets. This finding is also consistent with research by Montgomery Jr., (2026), who found that self-efficacy is a universal predictor of various forms of achievement, including Academic Performance. The highest beta coefficient of Academic Self-Efficacy (0.234) indicates that among the five factors studied, students' self-confidence in their academic abilities is the most decisive factor in their academic success. The consistency of this finding is reinforced by various recent empirical studies reporting the same results.

Scientifically, this finding confirms that Academic Self-Efficacy functions as a cognitive-motivational mechanism that regulates how students perceive academic challenges, how much effort they will deploy, and how long they will persist when facing failure. This deep-seated belief, when supported by adequate learning facilities, is empirically proven to be the primary engine in improving student academic achievement. Students with high self-efficacy tend to view difficult tasks as challenges to be overcome rather than as threats to be avoided. This is because strong self-efficacy is able to increase learning concentration, thereby providing students with a sharper understanding of the subject matter. Conversely, students with low self-efficacy tend to doubt their abilities, avoid difficult tasks, and give up easily when facing obstacles. This fragile psychological state often traps students in academic procrastination, especially when they fail to manage academic stress and self-control. Thus, self-efficacy is not just a passive belief, but an active force that fundamentally shapes learning behavior. The implication of this finding is that interventions to improve Academic Performance should be more focused on strengthening student self-confidence through mastery experiences, observing the success of peers (vicarious experiences), verbal persuasion from teachers and parents, and managing physiological conditions such as anxiety and stress. This strengthening effort is not only important for students but also relevant for educators, where teacher self-efficacy is closely related to their engagement in professional development. Teachers can provide tasks that gradually increase in difficulty so that students experience repeated success, which is the most powerful source of self-efficacy. Schools also need to provide emotion regulation training programs to help students manage academic anxiety that can weaken their self-confidence. The finding of the dominance of Academic Self-Efficacy sends a clear message that building students' confidence in their own abilities is the most strategic investment in efforts to improve academic achievement, even more important than simply increasing motivation or technical skills.

The third finding, which is quite interesting, is that Digital Skills do not have a significant effect on Academic Performance. This result contradicts the general assumption that "digital native" generations will automatically have better Academic Performance due to their access to and ability to use technology. The most plausible explanation for this finding is that the Digital Skills currently possessed by students are used more for non-academic activities, such as social media,

entertainment, and online games, rather than to support learning. High social media engagement can even intersect with students' moral aspects if not balanced by educational success. Critically, this finding reinforces the deconstruction of the "digital native" myth proposed by Wester dkk., (2023). They emphasize that the digital native label is often misleading because students' proficiency in using digital media does not automatically grant them information-skilled capabilities. The absence of a significant influence proves that students' presence in an all-digital world does not guarantee the cognitive ability to process academic information effectively. Furthermore, the assumption that digital-era students are capable of multitasking is merely a myth that can actually hinder the learning process if educational design relies too heavily on that ability. Ngwa dkk., (2022), in their research on student digital literacy, emphasize that the mechanical ability to use technology does not necessarily mean someone possesses the digital literacy required for learning. Therefore, a reconceptualization of digital literacy dimensions as more accurate predictors of academic engagement and success is needed.

Students may be very agile in using social media, which indeed plays a major role in the distribution and dissemination of educational publications today, but they are not necessarily able to find valid learning resources, use learning applications effectively, or manage gadget usage time for studying. This condition is relevant to the findings of (Khosa dkk., 2026), which show that students' level of acceptance toward e-learning systems is often still low. This low acceptance indicates that even though students possess technical skills, they do not always feel comfortable or ready to integrate that technology into a meaningful learning process. Without acceptance and mental readiness to use technology formally, high digital skills will still not contribute to improved academic achievement. This gap highlights the need for developing both technical and social competencies so that students are ready to face digitally mediated environments (Mendonca et al., 2021). In other words, Digital Skills alone are insufficient without the ability to organize, monitor, and evaluate the learning process itself. This is increasingly crucial considering that inclusivity in technology-based services still faces real challenges regarding access and skills (. The relatively high average of students' Digital Skills (3.88) that is not followed by an increase in Academic Performance indicates a gap between access and the utilization of technology for academic purposes. In fact, the appropriate utilization of learning media and digital literacy should be able to drive student learning motivation.

Scientifically, the finding regarding the non-significant effect of Digital Skills on Academic Performance in this study confirms that possessing technical skills in using digital devices does not automatically improve learning outcomes. This phenomenon can be explained through the perspective of productive versus consumptive technology use. To that end, the role of blended learning becomes essential in developing students' critical thinking skills in this digital era. Productive digital skills are used to create, analyze, and solve problems, whereas consumptive digital skills are used for the passive consumption of entertainment content. The transformation of education within the digital landscape also demands pedagogical innovations capable of directing technology toward more productive ends. The majority of students may possess proficiency in consumptive aspects, but not necessarily in the productive aspects relevant to learning. Healthy digital literacy even impacts students' mental health and altruistic behavior. In other words, Digital Skills are merely a tool; their effectiveness in improving academic achievement highly depends on how, when, and for what purpose the tool is used. Digital communication within educational environments and student participation need to be well-managed. This non-significant finding is a unique contribution of this research, as it differs from most previous studies that generally report a positive influence of digital skills on academic achievement. This difference is likely due to the



specific context of high school students in Surabaya and the dominant nature of digital technology use, which tends to be non-academic.

The implications of this finding are crucial for educators and policymakers: providing access to technology and technical digital skills training alone is insufficient. Schools need to direct the use of digital technology for learning purposes in a more structured manner and integrate it into the curriculum. Teachers can design assignments that require students to use digital skills productively, such as creating digital presentations, conducting online research using credible sources, or creating collaborative projects using online platforms. Furthermore, the digital literacy taught in schools needs to be expanded from mere technical ability to critical competence in evaluating information, managing digital distractions, and practicing online communication ethics. This finding also serves as a warning that massive investment in technological infrastructure without being balanced by fundamental pedagogical changes may not yield significant improvements in academic achievement. Therefore, policy priorities should shift from simply providing devices and internet connections toward developing learning models that effectively integrate technology to support students' higher-order thinking processes. Further research is needed to examine under what conditions digital skills become effective in improving academic achievement, for example, by testing the moderating role of self-regulated learning strategies or parental supervision in the relationship between digital skills and academic performance.

The fourth finding shows that Self-Regulated Learning Strategies have a positive and significant effect on Academic Performance. This result is in line with the self-regulated learning theory proposed by (Kuhn, 2024), which states that students who are able to manage their study time, set goals, monitor progress, and evaluate their learning outcomes will achieve higher performance compared to students who lack these abilities. In the post-pandemic learning process where students are required to be more independent, the ability to utilize Self-Regulated Learning Strategies has become increasingly crucial. This finding also reinforces the results of (Carvajal dkk., 2024), who found that self-regulated learning makes a unique contribution to Academic Performance beyond the contributions of motivation and cognitive ability. The average value for Self-Regulated Learning Strategies, which is still in the medium category (3.58) with the item for periodic evaluation of learning outcomes being the lowest (3.35) indicates that high school students in Surabaya still require training and guidance in developing their metacognitive abilities. The consistency of this finding is reinforced by various empirical studies that widely report the same.

Scientifically, this finding confirms that Self-Regulated Learning Strategies function as a metacognitive mechanism that allows students to actively control and direct their own learning processes. Unlike motivation, which provides energy, and self-efficacy, which provides belief, self-regulated learning provides the operational framework for how to learn effectively. Students with good self-regulated learning strategies do not only know what needs to be learned but also how to plan, monitor, and evaluate their learning processes systematically. This ability is crucial because, at the high school level, academic demands become increasingly complex and students are expected to demonstrate higher independence than in previous levels. The implication of this finding is that schools need to explicitly teach self-regulated learning skills to students, rather than simply assuming that students will develop them naturally as they age. Teachers can integrate the teaching of independent learning strategies into everyday subjects for example, by asking students to create weekly study plans, using reflection journals to record learning progress, and training students to perform self-evaluations after completing assignments. The lowest score on the item regarding periodic evaluation of learning outcomes (3.35) indicates that this metacognitive aspect is the weakest among students, making it a priority for intervention. School guidance and counseling can

also play a role in providing study skills training, such as time management techniques, effective note-taking methods, and exam strategies. Thus, strengthening Self-Regulated Learning Strategies is a long-term investment that not only improves current academic performance but also equips students with lifelong learning skills that will be beneficial in higher education and the workforce.

The fifth finding is that Academic Social Support does not significantly influence Academic Performance. This finding is interesting because it contradicts the results of research by (Kim, 2023), which found that social support from teachers, peers, and family plays an important role in students' academic adjustment. A potential explanation for this finding is that within the scope of high school students in Surabaya, who have entered late adolescence, internal factors such as Academic Self-Efficacy and Learning Motivation become more dominant than external factors like Academic Social Support. Students aged 16 to 18 tend to be more independent and rely more on their own abilities than on the support of others. This lack of significance can be understood through the perspective of socioeconomic status (SES) as expressed by Malecki and. In their study, it was found that social support did not have a significant relationship with academic performance (GPA) in groups of students from middle to upper socioeconomic backgrounds. Social support acts more as a crucial "buffer" for students facing economic vulnerability or high risk; however, for students in a stable and resource-supportive environment, additional social support no longer provides a linear impact on academic achievement. Additionally, the quality of social support may be more important than its quantity. Excessive support from parents can actually reduce student independence, while too little support can make students feel neglected. This finding also indicates that the current Academic Social Support may not be well-targeted or may not meet the specific needs of students. Support from peers, which had the lowest average (3.51) among the three sources of support, indicates that a culture of collaborative learning or academic discussion among peers has not been well-established among high school students in Surabaya. The non-significance of Academic Social Support in this study is inconsistent with several studies reporting a positive relationship between social support and academic achievement, but it aligns with the view that at the upper secondary level, internal factors begin to take over the dominant role in determining academic outcomes.

Scientifically, the finding of the non-significance of Academic Social Support on Academic Performance in this study confirms that external support from the social environment does not always have a direct effect on academic achievement, especially in the late adolescent population. This phenomenon can be explained through the perspective of adolescent developmental psychology. At ages 16 to 18, individuals are in a transition toward greater psychological independence. They tend to develop an internal locus of control, where academic success or failure is more attributed to their own abilities and efforts rather than to support from others. This tendency shows that social interactions and instructional methods now function more to trigger personal learning activity rather than simply providing direct technical assistance. Furthermore, social support may play a role that is more affective (reducing stress, increasing emotional well-being) rather than cognitive (directly increasing academic achievement). This aligns with the reconstruction of social exchange theory, which shows that the quality of social interaction is more closely related to the improvement of an individual's psychological well-being than to instant achievement. This indicates that the view of character education and the socio-emotional development of children within social interaction environments focuses more on the student's personal maturity. In other words, social support may be more effective as a buffer against academic pressure than as a factor that directly drives grade improvement. This non-significant finding is a unique contribution of this study, showing that in the context of high school students in

Surabaya, internal factors such as self-efficacy and motivation are more dominant than external factors like social support.

The implications of these findings are crucial for educators, counselors, and parents. First, schools and families should not assume that providing social support will automatically improve students' Academic Performance. Social support needs to be designed by considering quality, precision in targeting, and alignment with the developmental needs of the student. Support that is too controlling or overprotective can actually hinder the development of student independence. Second, support from peers, which had the lowest average (3.51), indicates the need to build a more positive collaborative learning culture. Schools can facilitate the formation of study groups, peer tutoring, or student mentoring programs to enhance academic support from peers. Third, teachers and counselors need to realize that at the high school level, interventions focusing on strengthening internal factors such as Academic Self-Efficacy and Learning Motivation may be more effective than interventions that rely solely on external support. Fourth, parents need to re-evaluate the patterns of support provided to their children. Empowering support, which gives children space to make decisions and take responsibility for their own learning, will be more beneficial than support that is controlling or overprotective. These findings also open opportunities for further research to test whether social support has an indirect effect on Academic Performance through mediators such as Academic Self-Efficacy or Learning Motivation, and to identify specific conditions where social support becomes more effective, such as for students from underprivileged family backgrounds or at earlier educational levels.

Overall, the findings of this research provide an important contribution to the development of educational psychology theory, particularly in understanding the determinants of Academic Performance in the digital era. The model, which tested the five variables simultaneously, successfully identified that internal psychological factors (Academic Self-Efficacy and Learning Motivation) play a more dominant role than competency factors (Digital Skills and Self-Regulated Learning Strategies) or environmental factors (Academic Social Support). The finding that Digital Skills were not significant provides an important warning to educators and policymakers that providing technological access alone is insufficient. Systematic guidance and training are required on how to effectively utilize digital technology for learning purposes. Similarly, the finding that Academic Social Support was not significant indicates the need for a re-evaluation of school counseling programs to ensure that the support provided truly meets student needs and does not inadvertently reduce their independence.

This research has several limitations that must be acknowledged. First, the use of self-report scales to measure psychological variables contains the potential for social desirability bias, where respondents tend to rate themselves better than they actually are. Second, the cross-sectional design, which only collects data at a single point in time, does not allow researchers to draw strong causal conclusions. Third, this study is limited to students of public high schools in Surabaya, so generalizations to private schools or other regions must be made with caution. Fourth, the R Square value of only 0.389 indicates that there are still many other variables influencing Academic Performance that were not examined in this study, such as emotional intelligence, learning styles, teaching quality, or the home environment. Future research is suggested to use longitudinal designs, expand the sample scope, and add other relevant variables to obtain a more comprehensive understanding of the determinants of students' Academic Performance.

## CONCLUSION

Based on the results of the analysis and discussion described, several important conclusions can be drawn from this research. First, Learning Motivation is proven to have a positive and significant effect on the Academic Performance of public high school students in Surabaya. The higher the Learning Motivation possessed by students, both intrinsic and extrinsic, the higher the Academic Performance they will achieve. Second, Academic Self-Efficacy is proven to have a positive and significant effect on Academic Performance, and even becomes the variable with the most dominant contribution among the five independent variables tested. This shows that students' confidence in their ability to complete academic tasks is the internal factor that most determines their academic success. Third, Digital Skills are proven to have no significant effect on Academic Performance. This finding indicates that having access and the ability to use digital technology alone is not enough to improve Academic Performance if it is not balanced with appropriate learning strategies and the utilization of technology for learning purposes. Fourth, Self-Regulated Learning Strategies are proven to have a positive and significant effect on Academic Performance. Students who are able to manage study time, set goals, monitor progress, and evaluate their learning outcomes tend to achieve higher performance compared to students who do not possess these abilities. Fifth, Academic Social Support is proven to have no significant effect on Academic Performance. This finding suggests that support from teachers, peers, and family has not been effective enough in improving Academic Performance, possibly because internal factors such as Academic Self-Efficacy and Learning Motivation are more dominant during late adolescence. Sixth, simultaneously, the five independent variables Learning Motivation, Academic Self-Efficacy, Digital Skills, Self-Regulated Learning Strategies, and Academic Social Support together have a significant effect on Academic Performance with a contribution of 38.9 percent, while the remaining 61.1 percent is explained by other variables outside of this research model.

## DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the author(s) used ChatGPT (OpenAI) in order to improve the readability and linguistic flow of the manuscript. After using this tool, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

## AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Formal analysis; Methodology; Project administration; Resources; Supervision; Validation; Writing – original draft; Writing – review & editing.

Author 2: Data curation; Investigation; Methodology; Software; Visualization; Validation; Writing – original draft.

Author 2: Data curation; Investigation; Methodology

## DECLARATION OF COMPETING INTEREST

The authors confirm that there are no relevant financial or non-financial competing interests to report. This research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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