

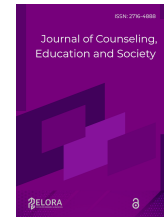


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Self-efficacy as mediator of social support effects on student engagement: a PLS-SEM analysis

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ABSTRACT

The study examined the effect of social support on student engagement with self-efficacy as a mediating variable among high school students. Student engagement plays an important role in supporting academic achievement and active participation in the learning process. Social support received from family, teachers, and peers was assumed to enhance students' confidence in their abilities, which in turn could increase their engagement in learning activities. This study employed a quantitative approach with a correlational design. Data were collected from high school students using social support, self-efficacy, and student engagement scales. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicated that social support positively affected self-efficacy and student engagement. Self-efficacy also positively affected student engagement and mediated the relationship between social support and student engagement. These results suggested that enhancing social support may strengthen students' self-efficacy and ultimately improve their engagement in learning. Therefore, schools, teachers, and parents should provide adequate support to foster students' active involvement in academic activities.



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Introduction

Education is a crucial aspect in developing the quality of human resources. Schools are required to continuously improve the quality of learning to help students achieve optimal academic achievement (Fajrudin et al., 2024). However, several studies have reported that many students continue to experience academic difficulties, including low academic achievement, reduced participation in classroom activities, and declining learning motivation (Sentosa et al., 2024). These conditions may indicate insufficient student engagement in the learning process, which is characterized by limited behavioral, emotional, and cognitive involvement in learning activities. This condition can indicate low student engagement in the learning process, characterized by minimal participation in the learning process (McQueen & Colegrave, 2022). This impacts low student academic achievement and hinders effective learning. According to Argyriou et al. (2022) academic achievement has a positive effect on student engagement.

Student engagement is considered an important factor in promoting students' academic success and overall learning development. According to Reeve & Tseng (2011) student engagement is a manifestation of motivation that is reflected in students' concrete actions during the teaching and learning process. This engagement is demonstrated through students' behavioral participation, emotional involvement, and cognitive investment in

learning activities (Fredricks et al., 2004; Schnitzler et al., 2021). Empirical studies have shown that students with higher levels of engagement tend to participate more actively in class, complete academic tasks more effectively, and demonstrate greater persistence in learning activities. Furthermore, student engagement has been found to be positively associated with class participation, task completion, and higher academic achievement (Campeanu et al., 2023; Wong et al., 2023).

Although student engagement plays a crucial role in supporting student learning success, some studies indicate that student engagement levels are still suboptimal. A study in Kashmir, India, involving 700 high school students, found that 23.4% of students were in the high engagement category, 50.1% were in the moderate engagement category, and 26.4% were in the low engagement category (Parveen & Jan, 2023). A study involving 775 students in Indonesia showed that 94.45%, equivalent to 732 students, had low engagement scores (Kristiana et al., 2023). However, a study conducted at a junior high school in Klaten, Central Java, involving 237 students showed that 93.2% were in the high engagement category, and 7.8% were in the low engagement category (Kanapi et al., 2024). In fact, a recent study at a high school in Surabaya involving 112 high school students showed that 66.07% of students were in the high category for student engagement (Widyanti, 2026). Based on this data, there is variation in student engagement among students. The findings above indicate considerable variation in student engagement across different educational settings. While some studies reported predominantly low levels of engagement, others found that most students demonstrated high engagement. These inconsistent findings suggest that student engagement may be influenced by various contextual and psychological factors that require further investigation.

Furthermore, this condition indicates that student engagement remains an important concern in educational settings. Students with low levels of engagement tend to participate less actively in classroom activities, invest less effort in academic tasks, and demonstrate lower persistence when facing learning challenges, which may negatively affect their learning process and academic performance. In contrast, students with high levels of student engagement tend to achieve better academic outcomes and demonstrate more optimal learning performance (Li & Xue, 2023; X. Xu et al., 2023).. Consistent with these findings, Delfino (2019). reported that students with higher levels of engagement tended to achieve higher academic performance, highlighting the important role of student engagement in supporting academic success. Beyond academic outcomes, student engagement is also associated with students' psychological well-being, as lower levels of engagement have been linked to poorer psychological adjustment and well-being (Birni, 2023).

Low student engagement is influenced by various factors, one of which is social support. Research conducted by Firdaus & Fikri (2025) shows that social support has a positive relationship with student engagement, so students with high social support tend to be more involved in both academic and non-academic activities. Social support can come from parents, teachers, peers, or individuals deemed meaningful, and can be provided in the form of emotional support, appreciation (appraisal support), informational support, and instrumental support (Mahmuda & Jalal, 2022). It acts as a resource that helps students face academic demands and various challenges during the learning process. According to Basith et al. (2025) social support has a positive effect on students' academic resilience, indicating that the higher the social support received by students, the greater their ability to face various academic challenges and pressures. Students who receive adequate social support tend to feel valued, accepted, and secure in their learning environment.

Despite the established importance of social support for engagement, empirical data reveals variation in support levels students actually receive. A study conducted on 183 students at SMAN 1 Wates, Yogyakarta, showed that 74.3% were in the high category, and 25.7% were in the moderate category (Puspitasari et al., 2021). Furthermore, a study conducted on high school students in East Lampung showed that 120 students were in the high category (Lutfianawati et al., 2022). Furthermore, a study conducted on 78 students at SMAN 1 Gading Rejo, Lampung, showed that 38.5% were in the low category, followed by 44.9% in the moderate category, and 16.7% in the high category (Nabila et al., 2025). The results of the study, Bi et al. (2021) which involved 183,918 adolescents aged 11–15 from 42 European countries, stated that the highest level of social support was provided by family, followed by peers, teachers, and classmates. These data indicate that some students still feel they receive insufficient attention, assistance, or encouragement from parents, teachers, or peers in dealing with academic demands.

A study by Yulina et al. (2024) found that 45.8% of the variance in student engagement was explained by social support. Similarly, Sari & Itryah (2023) reported that teacher social support contributed 10.6% to student engagement. Furthermore, a study by Akmal et al. (2022) found a significant relationship between social support and student engagement, with social support accounting for 28.8% of the variance in student engagement. These findings consistently indicate that social support plays an important role in fostering students' engagement in learning activities. Therefore, students who receive higher levels of social support tend to participate more

actively in learning, demonstrate greater motivation, and become more involved in academic activities than students who receive lower levels of support.

However, the influence of social support on student engagement is thought to be more than just a direct one. Social support can also contribute to increased student engagement through psychological factors within students. Research conducted by Tanthawi & Fathiyah (2025) showed that self-efficacy acts as a mediator in the relationship between academic social support and student engagement. These findings indicate that the social support students receive can increase their confidence in their abilities, which in turn encourages higher engagement in the learning process. Therefore, one psychological factor thought to play a role in explaining the relationship between social support and student engagement is self-efficacy.

Self-efficacy is the belief in one's ability to organize and take action to achieve specific goals. Individuals with high self-efficacy tend to demonstrate greater effort, perseverance in the face of difficulties, and higher motivation in completing tasks (Bandura, 1997). In educational settings, students with high self-efficacy tend to be more active in learning, bold in expressing opinions, and demonstrate higher engagement. According to Azila-Gbette et al. (2021) self-efficacy influences student engagement. Furthermore, self-efficacy can also predict student engagement (Miao et al., 2025). This means that the higher an individual's belief in their abilities, the higher their engagement in learning. According to Shengyao et al. (2024) students with high self-efficacy tend to be more motivated to face learning challenges, engage in difficult tasks, or work in groups compared to students with low self-efficacy.

However, various studies have shown that students' self-efficacy levels are still suboptimal. A study at a junior high school in Jakarta involving 189 students showed that 42.1% were in the high category, 47.6% were in the medium category, 5.6% were in the low category, and only 0.8% were in the very low category (Octaviani & Sundari, 2024). Furthermore, a study of 100 students at MTs Nurul Hidayah found that 18% were in the low category (Hatta et al., 2021). Furthermore, a study in Ogan Ilir, South Sumatra, involving 109 respondents, found that 63.3% were in the medium category (Zelya et al., 2025). These findings indicate that some students still doubt their ability to complete academic assignments, face learning challenges, and achieve set learning targets. Furthermore, the study also showed that self-efficacy is known to have a positive relationship with student engagement. Students who have high confidence in their abilities tend to be more active participants in learning, show greater persistence, and are more involved in various academic activities than students who have low self-efficacy.

Various research results indicate a positive relationship between social support and student engagement. The results of Yulina et al. (2024) study showed that peer social support was positively related to student engagement and contributed 45.8% to student engagement. Furthermore, Firdaus & Fikri (2025) showed that social support has a positive relationship with student engagement. In addition, research shows that social support also has a positive effect on self-efficacy, where students who receive high social support tend to have greater confidence in their abilities to face various academic demands (Chen et al., 2025). On the other hand, self-efficacy is known to play an important role in increasing student engagement because students who have confidence in their abilities tend to be more active, diligent, and involved in the learning process. The results of Tanthawi & Fathiyah (2025) study also found that self-efficacy acts as a mediator in the relationship between academic social support and student engagement, so the effect of social support on student engagement occurs not only directly, but also through increasing student self-efficacy.

Although extensive research has examined the relationships among social support, self-efficacy, and student engagement, several important issues remain unresolved. Previous studies have consistently reported positive associations among these variables; however, findings regarding student engagement levels among Indonesian students remain inconsistent, with some studies reporting predominantly low engagement and others reporting predominantly high engagement (Kanapi et al., 2024; Kristiana et al., 2023; Widyanti, 2026). These inconsistencies suggest that additional psychological mechanisms may be involved in explaining variations in student engagement. Furthermore, most previous studies have focused on university students (Azila-Gbette et al., 2021; Miao et al., 2025), while research involving high school students remains relatively limited. In addition, studies examining self-efficacy as a mediating mechanism linking social support and student engagement among high school students are still scarce (Tanthawi & Fathiyah, 2025). Therefore, further research is needed to better understand how social support influences student engagement through self-efficacy among high school students.

Therefore, this research is crucial, considering that student engagement is a key factor in improving students' academic success and psychological well-being (Birni, 2023; Delfino, 2019). High levels of student engagement can encourage students to actively participate in the learning process, demonstrate higher learning motivation, and achieve more optimal academic results. Therefore, a deeper understanding of the factors that can enhance

student engagement is needed. In this regard, social support and self-efficacy are thought to play a significant role in encouraging student engagement in learning. Understanding the role of these two variables is expected to provide a basis for schools, teachers, and parents in designing effective strategies to increase student engagement in the learning process (Azila-Gbette et al., 2021; Tanthawi & Fathiyah, 2025).

The present study offers a distinct contribution to the existing literature by examining self-efficacy as a mediating mechanism in the relationship between social support and student engagement among Indonesian senior high school students. While previous studies have generally focused on university students or examined direct relationships among these variables, evidence regarding the indirect pathway through which social support influences student engagement among senior high school students remains limited. In addition, adolescence represents a critical developmental period during which support from parents, teachers, and peers may play an important role in shaping students' beliefs about their capabilities and their engagement in learning activities. By integrating social support, self-efficacy, and student engagement within a single mediation model, this study seeks to provide a more comprehensive understanding of the psychological processes underlying student engagement among Indonesian senior high school students. Furthermore, the findings are expected to enrich the literature on student engagement by providing empirical evidence from the context of secondary education in Indonesia.

Based on the description above, this study was conducted to gain a more comprehensive understanding of the mechanism through which social support influences student engagement through self-efficacy among senior high school students. Specifically, this study examines both the direct effect of social support on student engagement and the indirect effect through self-efficacy as a mediating variable. By employing a mediation framework, this study contributes to the literature by providing a more comprehensive explanation of how social support translates into higher levels of student engagement. This contribution extends previous studies that primarily focused on direct relationships among these variables and provides additional empirical evidence from the context of Indonesian senior high school students. Furthermore, the findings are expected to serve as a reference for schools, teachers, and parents in developing strategies to enhance student engagement through strengthening social support and students' self-efficacy.

Method

This study used a quantitative approach with an explanatory design to examine the effect of social support on student engagement, with self-efficacy as a mediator in students. A quantitative approach is used to objectively examine the relationship between variables through statistical analysis (Sugiyono, 2023). The study was conducted at SMA Negeri 2 Kisaran in the even semester of the 2025/2026 academic year. The variables studied consisted of social support as the independent variable, student engagement as the dependent variable, and self-efficacy as the mediator.

The population in this study consisted of all 682 students enrolled at SMA Negeri 2 Kisaran. The sample size was determined using the Slovin formula with a 5% margin of error, resulting in a sample of 252 students, comprising 129 males (51.2%) and 123 females (48.8%) (Sugiyono, 2023). The sample size was also considered adequate for SEM-PLS analysis because it exceeded the minimum sample size recommendations for testing structural and mediation models of comparable complexity (Hair et al., 2022). A proportionate stratified random sampling technique was employed by dividing the population into strata based on grade level and academic major (Sugiyono, 2023). The number of respondents selected from each stratum was determined proportionally according to the size of the subgroup, and participants were then randomly selected using the student attendance lists provided by the school. This procedure ensured that all groups within the population had a proportional opportunity to be represented in the research sample and helped minimize sampling bias.

Research data were collected using three psychological instruments. Student engagement was measured using the Indonesian version of the Student Engagement Scale (SES) adapted by Pratama & Guspa (2022) based on the theory developed by Reeve & Tseng (2011). The scale consists of 22 items measuring four dimensions: agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement, with responses rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. (1988) and adapted into Indonesian by Sulistiani et al. (2022). The scale consists of 12 items assessing support from family, friends, and significant others, rated on a seven-point Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). Self-efficacy was measured using the General Self-Efficacy Scale (GSE) developed by Schwarzer & Jerusalem (1995) and adapted into Indonesian by Novrianto et al. (2019). This scale consists of 10 items measuring individuals' beliefs in their ability to cope with various situations and challenges, rated on a four-point Likert scale ranging from 1 (not at all true) to 4 (exactly true). For all instruments, total

scores were obtained by summing item responses, with higher scores indicating higher levels of the respective constructs.

In the process of developing research instruments, validity is a very important aspect because it relates to the instrument's ability to measure the constructs it is supposed to measure. The higher the validity of an instrument, the more accurately it represents the phenomenon being studied. In addition, reliability is needed to ensure the consistency of measurement results so that the data obtained can be trusted (Syahputra et al., 2025). Therefore, before being used in the study, all instruments were evaluated based on validity and reliability criteria. The test results showed that the student engagement scale had a Cronbach's Alpha value of 0.872, Composite Reliability of 0.912, and AVE of 0.722. The social support scale had a Cronbach's Alpha value of 0.770, Composite Reliability of 0.867, and AVE of 0.685. Meanwhile, the self-efficacy scale showed a Cronbach's Alpha value of 0.805, Composite Reliability of 0.867, and AVE of 0.719. Based on the criteria proposed by Hair et al. (2022), all instruments met the requirements of convergent validity and construct reliability and were therefore suitable for use in research. Discriminant validity was further assessed using the Heterotrait–Monotrait Ratio (HTMT). The HTMT values ranged from 0.505 to 0.851, all of which were below the recommended threshold of 0.90, indicating satisfactory discriminant validity among the constructs of social support, self-efficacy, and student engagement (Hair et al., 2022).

The research procedure began with instrument preparation and obtaining research permits from the school. After obtaining permission, the researcher coordinated with the school regarding the research schedule. Prior to data collection, respondents were provided with an informed consent form containing information regarding the research objectives, procedures, benefits, data confidentiality, and the respondent's right to refuse or discontinue participation at any time without any consequences. Respondents who expressed their willingness to participate were then asked to voluntarily complete the research questionnaire. The questionnaires were distributed directly to the students participating in the research. After all data was collected, it was checked, coded, and processed for statistical analysis.

Data analysis was conducted using the Structural Equation Modeling-Partial Least Squares (SEM-PLS) approach with the assistance of SmartPLS 4 software. The SEM-PLS method was chosen because it can test direct and indirect relationships between variables simultaneously, and is suitable for testing mediation models involving self-efficacy as an intermediary variable (Hair et al., 2022). The analysis was carried out in two stages: evaluation of the measurement model (outer model) and evaluation of the structural model (inner model). Evaluation of the outer model was carried out by testing convergent validity, discriminant validity, and construct reliability. Next, evaluation of the inner model was carried out by testing the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), path coefficient, and testing the mediation effect using the bootstrapping technique. The relationship between variables was declared significant if the p-value < 0.05 and the t-statistic value was greater than 1.96 at the 95% confidence level (Hair et al., 2022).

Results and Discussions

This study aimed to examine the role of self-efficacy as a mediator in the relationship between social support and student engagement in students at SMA Negeri 2 Kisaran. The analysis showed that social support positively influenced self-efficacy and student engagement. Furthermore, self-efficacy was shown to mediate the relationship between social support and student engagement. Before presenting the hypothesis results, the descriptive test results are presented in Table 1 as follows:

Table 1. Descriptive

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
Student Engagement (Y)	252	27.00	101.00	61.5159	15.46271
Social Support (X)	252	13.00	62.00	31.6190	8.44184
Self-Efficacy (M)	252	32.00	149.00	74.9206	23.09002

Based on Table 1, the number of respondents in this study was 252 students. The student engagement variable had a minimum score of 27 and a maximum score of 101, with a mean value ($M = 61.52$) and a standard deviation ($SD = 15.46$). These findings indicate considerable variation in students' engagement levels and suggest that not all students were equally involved in learning activities. The social support variable had a minimum score of 13 and a maximum score of 62, with a mean value ($M = 31.62$) and a standard deviation ($SD = 8.44$). These results indicate differences in the level of social support received by students from parents, teachers, and peers. Meanwhile, the self-efficacy variable had a minimum score of 32 and a maximum score of 149, with a mean value ($M = 74.92$) and a standard deviation ($SD = 23.09$). These findings suggest that students

differed in their confidence to manage academic demands and challenges. Further interpretation of these descriptive findings is provided through the categorization analysis presented in Tables 2–4.

Table 2. Categorization of Student Engagement

Category	Score Range	Frequency (n)	Percentage (%)
Low	22–66	158	62.70
Moderate	67–110	94	37.30
High	111–154	0	0.00
Total	–	252	100.00

Based on Table 2, the majority of students were categorized as having a low level of student engagement, comprising 158 students (62.70%), while 94 students (37.30%) were classified in the moderate category. No students were categorized as having a high level of student engagement. These findings indicate that the level of student engagement among the participants tended to be low, as evidenced by the predominance of respondents in the low category compared to the other categories. The categorization of social support is presented in Table 3 below.

Table 3. Categorization of Social Support

Category	Score Range	Frequency (n)	Percentage (%)
Low	12–36	178	70.63
Moderate	37–60	73	28.97
High	61–84	1	0.40
Total	–	252	100.00

Based on Table 3, the majority of students were found to have a low level of social support, comprising 178 students (70.63%) of the total sample. Furthermore, 73 students (28.97%) were categorized as having a moderate level of social support, while only 1 student (0.40%) was classified in the high category. These findings indicate that the level of social support received by the students tended to be low, suggesting that most students had not yet received optimal support from their social environment, including parents, teachers, and peers. This finding highlights social support as an important aspect that warrants further attention, as it may play a significant role in helping students cope with academic demands and enhancing their engagement in the learning process. The categorization of self-efficacy is presented in Table 4 below.

Table 4. Categorization of Self-Efficacy

Category	Score Range	Frequency (n)	Percentage (%)
Low	10–20	44	17.46
Moderate	21–30	120	47.62
High	31–40	88	34.92
Total	–	252	100.00

Based on Table 4, the majority of students were categorized as having a moderate level of self-efficacy, comprising 120 students (47.62%) of the total sample. Furthermore, 88 students (34.92%) were classified in the high category, while 44 students (17.46%) were categorized as having a low level of self-efficacy. These findings indicate that, in general, students possessed a relatively positive level of confidence in their ability to manage academic tasks and challenges. Nevertheless, a proportion of students still demonstrated low self-efficacy, highlighting the need for interventions aimed at strengthening students' confidence in their capabilities in order to support more optimal engagement in the learning process.

After obtaining an overview of the levels of student engagement, social support, and self-efficacy among the research participants, the next step was to evaluate the measurement model (outer model). This evaluation was conducted to ensure that the research instruments met the required validity and reliability criteria prior to testing the structural model. The assessment of the outer model included convergent validity, discriminant validity, and construct reliability. Convergent validity was evaluated using the outer loading values and the Average Variance Extracted (AVE). According to Hair et al. (2022), indicators are considered valid when they exhibit outer loading values of at least 0.70 and AVE values of at least 0.50. The outer loading results are presented in Figure 1 below.

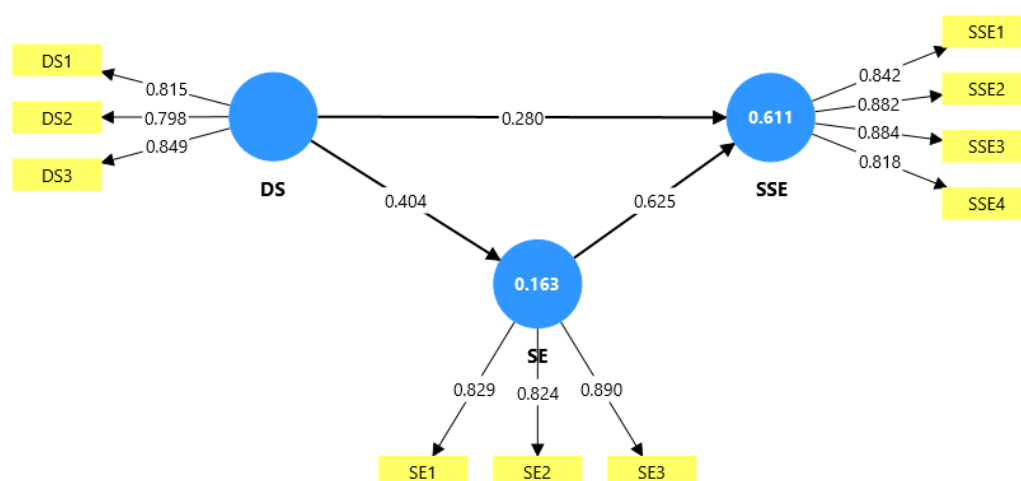


Figure 1. Outer Loading Diagram

Convergent validity was assessed by examining the outer loading values of each indicator on its respective construct. According to Hair et al. (2019), indicators are considered to demonstrate adequate convergent validity when their outer loading values exceed 0.70. Based on the analysis results, all indicators of the Social Support (SS), Self-Efficacy (SE), and Student Engagement (SSE) constructs exhibited outer loading values above the recommended threshold of 0.70. For the Social Support construct, outer loading values ranged from 0.798 to 0.849. The Self-Efficacy construct showed outer loading values ranging from 0.824 to 0.890, while the Student Engagement construct demonstrated outer loading values ranging from 0.818 to 0.884. These results indicate that all indicators adequately represented their respective constructs and satisfied the criteria for convergent validity. Therefore, all indicators were deemed valid and retained for subsequent analyses. The results of the reliability assessment are presented in Table 5 below.

Table 5. Results of Construct Reliability and Validity Assessment

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Social Support (SS)	0.758	0.861	0.673
Self-Efficacy (SE)	0.805	0.885	0.719
Student Engagement (SSE)	0.880	0.917	0.734

Based on Table 5, all research constructs met the criteria for reliability and convergent validity. The Cronbach's Alpha values for Social Support (0.758), Self-Efficacy (0.805), and Student Engagement (0.880) exceeded the minimum threshold of 0.70, indicating satisfactory internal consistency. In addition, the Composite Reliability values for all constructs were above 0.70, with values of 0.861, 0.885, and 0.917, respectively, demonstrating a high level of construct reliability. Furthermore, the Average Variance Extracted (AVE) values for all variables exceeded the recommended threshold of 0.50, ranging from 0.673 to 0.734. These results indicate that the indicators were able to explain a substantial proportion of the variance in their respective constructs. Therefore, all variables in this study were considered both reliable and valid, making them suitable for further analysis. The results of the Goodness of Fit (GoF) assessment are presented in Table 6 below.

Table 6. Goodness of Fit (GoF) Results

Goodness of Fit Index	Saturated Model	Estimated Model	Criteria
SRMR	0.087	0.087	Marginal Fit
d_ULS	0.419	0.419	Fit
d_G	0.282	0.282	Fit
Chi-square	429.315	429.315	Fit
NFI	0.718	0.718	Not Fit

Based on Table 6, the results of the Goodness of Fit assessment indicate that the proposed research model demonstrated an acceptable level of model fit. The SRMR value of 0.087 falls within the marginal fit category, as it slightly exceeds the recommended threshold of 0.08. Meanwhile, the d_ULS value of 0.419 and the d_G value of 0.282 suggest a satisfactory level of model fit, as lower values indicate a better correspondence between

the model and the observed data. The Chi-square value of 429.315 was also considered acceptable within the context of PLS-SEM model evaluation. However, the NFI value of 0.718 did not meet the recommended criterion of ≥ 0.90 , indicating that the model did not achieve an adequate fit according to this particular index. Nevertheless, since the majority of the Goodness of Fit indicators demonstrated satisfactory results, the overall model can be considered sufficiently appropriate for further analysis and hypothesis testing. Having met the required model adequacy criteria, the structural model was subsequently used to examine the relationships among the constructs included in the study.

Following the assessment of model fit, the structural model was evaluated using the coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). The coefficient of determination (R^2) was used to assess the explanatory power of the model in predicting the endogenous variables. The results are presented in Table 7.

Table 7. Coefficient of Determination (R^2)

Endogenous Variable	R^2	Interpretation
Self-Efficacy (M)	0,157	Weak
Student Engagement (Y)	0,617	Moderate

Based on Table 7, Social Support explained 15.7% of the variance in Self-Efficacy ($R^2 = 0.157$), while Social Support and Self-Efficacy jointly explained 61.7% of the variance in Student Engagement ($R^2 = 0.617$). These findings indicate that the model demonstrated moderate explanatory power for Student Engagement and weaker explanatory power for Self-Efficacy. The effect size (f^2) was examined to determine the contribution of each exogenous construct to the endogenous constructs. The results are presented in Table 8.

Table 8. Effect Size (f^2)

Path	f^2	Interpretation
DS $\rightarrow$ SE	0.187	Moderate
DS $\rightarrow$ SSE	0.255	Moderate
SE $\rightarrow$ SSE	0.757	Large

As shown in Table 8, Social Support had a moderate effect on both Self-Efficacy ($f^2 = 0.187$) and Student Engagement ($f^2 = 0.255$). In contrast, Self-Efficacy demonstrated a large effect on Student Engagement ($f^2 = 0.757$), indicating that students' beliefs in their capabilities contributed substantially to their engagement in learning activities. Furthermore, predictive relevance (Q^2) was assessed using the PLSpredict procedure to evaluate the predictive capability of the structural model. The results are presented in Table 9.

Table 9. Predictive Relevance (Q^2)

Variable	Q^2
Self-Efficacy	0.145
Student Engagement	0.297

The results showed that all endogenous constructs had positive Q^2 values, indicating that the model possessed predictive relevance. Specifically, the Q^2 values for Self-Efficacy and Student Engagement were 0.145 and 0.297, respectively, suggesting that the model had adequate predictive capability for both endogenous variables. Having established the explanatory and predictive power of the structural model, hypothesis testing was subsequently conducted to examine the relationships among the study variables. Hypothesis testing was conducted to determine the significance of the direct effects among variables based on the path coefficients, t-statistics, and p-values. The results of the hypothesis testing are presented table in below.

Table 10. Direct Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
DS $\rightarrow$ SE	0.404	0.405	0.065	6.181	0.000
DS $\rightarrow$ SSE	0.280	0.283	0.055	5.128	0.000
SE $\rightarrow$ SSE	0.625	0.623	0.051	12.315	0.000

Based on Table 10, the results of the direct effect analysis indicate that all relationships among the variables were positive and statistically significant. The effect of Social Support on Self-Efficacy showed a path coefficient

(β) of 0.404, with a t-statistic of 6.181 and a p-value of 0.000 ($p < 0.05$). These results indicate that Social Support had a positive and significant effect on Self-Efficacy; therefore, the first hypothesis (H1) was supported. Furthermore, the effect of Social Support on Student Engagement yielded a path coefficient of 0.280, with a t-statistic of 5.128 and a p-value of 0.000 ($p < 0.05$). This finding indicates that Social Support had a positive and significant effect on Student Engagement; thus, the second hypothesis (H2) was supported. In addition, the effect of Self-Efficacy on Student Engagement showed a path coefficient of 0.625, with a t-statistic of 12.315 and a p-value of 0.000 ($p < 0.05$). These results demonstrate that Self-Efficacy had a positive and significant effect on Student Engagement; therefore, the third hypothesis (H3) was supported. Overall, all hypotheses regarding the direct effects proposed in this study were empirically supported.

Furthermore, to determine whether Self-Efficacy served as a mediating variable in the relationship between Social Support and Student Engagement, an indirect effect analysis was conducted. This analysis aimed to examine the significance of the mediating pathway through Self-Efficacy. The results of the indirect effect analysis are presented in Table

Table 11. Indirect effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
DS -> SSE	0.252	0.252	0.041	6.144	0.000

Based on Table 11, the results of the indirect effect analysis indicate that the indirect effect of Social Support on Student Engagement through Self-Efficacy had a path coefficient of 0.252, with a t-statistic of 6.144 and a p-value of 0.000 ($p < 0.05$). These results demonstrate that the indirect effect was positive and statistically significant. Therefore, Self-Efficacy was confirmed to serve as a mediating variable in the relationship between Social Support and Student Engagement, supporting the fourth hypothesis (H4). This finding suggests that increased social support received by students can enhance their self-efficacy, which subsequently contributes to higher levels of student engagement. Furthermore, because the direct effect of Social Support on Student Engagement remained significant while the indirect effect through Self-Efficacy was also significant, Self-Efficacy was found to function as a partial mediator in the relationship between Social Support and Student Engagement.

To provide a clearer illustration of the relationships among the variables in the proposed research model, the results of the direct effect analysis are also presented in the form of a path diagram in Figure 2. The diagram depicts the direction of the relationships and the significance levels among the constructs examined in this study.

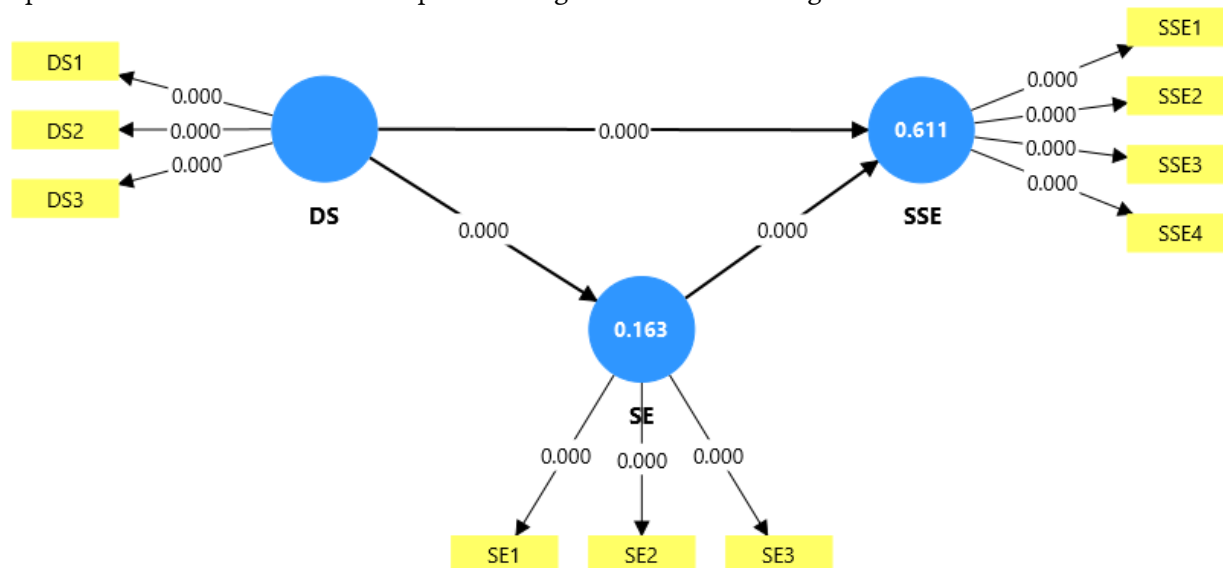


Figure 2. Bootstrapping Output Diagram

Based on Figure 2, all relationships among the variables demonstrated a significance value of 0.000 ($p < 0.05$). These results indicate that Social Support had a significant effect on both Self-Efficacy and Student Engagement, while Self-Efficacy also had a significant effect on Student Engagement. Therefore, all direct relationships proposed in the research model were found to be significant.

The findings of this study revealed that social support had a positive and significant effect on both self-efficacy and student engagement among students. In addition, self-efficacy was found to have a positive and significant

effect on student engagement. The results also demonstrated that self-efficacy served as a partial mediator in the relationship between social support and student engagement. These findings suggest that increasing the level of social support received by students not only directly enhances their engagement in learning activities but also strengthens their confidence in their own abilities, which in turn contributes to higher levels of student engagement. Therefore, social support and self-efficacy are important factors in promoting students' active involvement in the learning process.

The results of this study indicated that social support had a positive and significant effect on students' self-efficacy. This finding suggests that the higher the level of social support received by students, the greater their confidence in their ability to cope with various academic demands. This finding is consistent with Social Cognitive Theory proposed by Albert Bandura (1997), which explains that self-efficacy is influenced by several sources, one of which is verbal persuasion. Verbal persuasion refers to the support, encouragement, and positive feedback provided by individuals within one's social environment. In the educational context, support from parents, teachers, and peers can strengthen students' confidence in their ability to successfully face and manage various academic challenges.

Furthermore, the findings of this study are supported by Huang & Wang (2023) who reported that teacher support positively influences students' academic self-efficacy. Similarly, Xu et al. (2023) found that social support significantly contributes to the enhancement of academic self-efficacy among university students. These findings suggest that social support fosters a sense of being valued, cared for, and trusted in one's abilities, leading students to develop more positive perceptions of their own competence. When students receive support from their surrounding environment, they become more confident in completing academic tasks, overcoming learning difficulties, and achieving their educational goals.

In addition, Kleppang et al. (2023) demonstrated that a supportive social environment can strengthen individuals' beliefs in their ability to cope with various challenges and demands. The consistency of these findings across studies indicates that social support is an important factor contributing to the development and enhancement of self-efficacy across different educational levels. These results suggest that social support received from parents, teachers, and peers can provide students with a sense of security, appreciation, and confidence in their capabilities when facing academic demands. Consequently, students are more likely to develop positive perceptions of their abilities, become more confident in completing tasks, effectively manage learning difficulties, and successfully achieve their academic goals.

The results of this study indicated that social support had a positive and significant effect on students' engagement. This finding suggests that the higher the level of social support received by students, the greater their engagement in the learning process. This result is consistent with the Self-System Model of Motivational Development proposed by (Connell & Wellborn, 1991), which emphasizes the important role of the social environment in fostering individuals' engagement in learning activities. Support provided by parents, teachers, and peers can help satisfy students' psychological needs for acceptance, appreciation, and positive relationships with their social environment. The fulfillment of these needs encourages students to participate more actively, demonstrate greater attention to learning, and become more emotionally and cognitively engaged in academic activities.

The findings of this study are supported by previous research demonstrating that social support is an important factor in enhancing student engagement. Grazia & Molinari (2023) found that support provided by the school environment was positively associated with students' engagement in the learning process. Similarly, Chen et al. (2023) reported that students who received high levels of social support tended to exhibit greater academic engagement compared to those who received lower levels of support. In addition, Zhang & Han (2026) found that support from teachers and peers contributed to increased participation, motivation, and engagement in learning activities. The consistency of these findings suggests that social support plays a crucial role in creating a learning environment that effectively promotes students' engagement. These findings are also consistent with the study conducted by Purnomo et al. (2024) which showed that parental support contributes to increased learning motivation among students. Support provided by significant individuals in students' immediate environment helps them develop more positive attitudes toward learning, thereby encouraging greater involvement in various academic activities.

The findings of this study suggest that students who receive social support from parents, teachers, and peers are more likely to feel comfortable, valued, and motivated to engage in the learning process. Such conditions enable students to participate more actively in learning activities, demonstrate greater interest in their studies, and exert greater effort in completing academic tasks. Conversely, low levels of social support may lead to reduced engagement in the learning process, as students may feel that they receive insufficient assistance and encouragement from their surrounding environment.

The results of this study indicated that self-efficacy had a positive and significant effect on students' engagement. This finding suggests that the higher students' confidence in their own abilities, the greater their engagement in the learning process. Moreover, compared to the other direct relationships examined in this study, the effect of self-efficacy on student engagement had the largest path coefficient ($\beta = 0.625$), indicating that self-efficacy is a particularly important factor in enhancing students' involvement in academic activities.

This finding is consistent with Social Cognitive Theory proposed by Albert Bandura (1997), which posits that individuals' beliefs in their capabilities influence their behavioral choices, level of effort, persistence, and resilience when facing challenges. Individuals with high self-efficacy are more likely to believe that they can successfully complete assigned tasks, which in turn encourages them to participate more actively in various activities. In the educational context, students with high self-efficacy tend to be more confident in dealing with academic demands, more willing to adopt new learning strategies, and more persistent when encountering difficulties during the learning process.

The important role of self-efficacy in influencing individual behavior is also supported by Sari et al. (2025) who found that self-efficacy contributes to the development of adolescent behavior. This finding reinforces the notion that confidence in one's own abilities is a psychological factor that plays a significant role in determining how individuals respond to various demands and challenges they encounter.

The findings of this study are further supported by previous research demonstrating that self-efficacy is an important predictor of student engagement. Meng & Zhang (2023) found that students' beliefs in their capabilities were positively associated with engagement in the learning process and academic achievement. Similarly, Alemayehu & Chen (2023) reported that self-efficacy contributes to increased engagement by enhancing students' motivation and persistence in completing academic tasks. In addition, van Gog et al. (2024) explained that individuals with higher levels of self-efficacy tend to exhibit greater engagement because they perceive challenges as manageable and achievable rather than as threats.

These findings are also supported by Fajri et al. (2023) who demonstrated that students' ability to manage academic challenges plays an important role in fostering their engagement in the learning process. Students who develop strong beliefs in their own abilities are better able to cope with academic obstacles in an adaptive manner, allowing them to remain actively engaged in learning activities. Furthermore, the findings are consistent with those of Fadhilah et al. (2026) who reported that self-confidence serves as a form of psychological capital that supports individuals in interacting with and actively engaging in their environment. These results further reinforce the idea that confidence in one's own abilities encourages students to participate more actively in various activities, including learning-related activities.

The findings of this study suggest that students' beliefs in their own abilities constitute an important psychological factor in promoting engagement in the learning process. Students who are confident in their capabilities are more likely to participate actively in learning activities, express their opinions, engage in discussions, and demonstrate greater persistence in completing academic tasks. In contrast, students with low self-efficacy tend to doubt their abilities more easily and are less likely to engage in learning activities. Therefore, enhancing students' self-efficacy represents an important strategy for increasing student engagement within the school environment.

The results of this study also revealed that self-efficacy served as a partial mediator in the relationship between social support and student engagement among students. This finding was evidenced by the positive and significant indirect effect of social support on student engagement through self-efficacy. Furthermore, the direct effect of social support on student engagement remained significant, indicating that self-efficacy functioned as a partial mediator in this relationship. These findings suggest that social support not only directly influences students' engagement in learning but also operates indirectly by strengthening students' confidence in their own abilities.

This finding can be explained through Social Cognitive Theory proposed by Albert Bandura (1997), which posits that human behavior results from the reciprocal interaction among environmental factors, personal factors, and behavior. In the context of this study, social support serves as an environmental factor that provides students with emotional support, appreciation, information, and practical assistance. Such support subsequently influences the personal factor of self-efficacy, which in turn promotes positive behavioral outcomes in the form of student engagement. In other words, students who receive high levels of social support are more likely to develop stronger confidence in their abilities, leading them to become more active and engaged in the learning process.

The findings of this study are supported by Tanthawi & Fathiyah (2025) who found that self-efficacy serves as a mediating variable in the relationship between academic social support and student engagement among

high school students. Similar findings were reported by Lent et al. (1994)) through Social Cognitive Career Theory (SCCT), which proposes that environmental support enhances individuals' self-efficacy beliefs, thereby influencing their behavior and achievement outcomes. According to this theory, support received from the surrounding environment can strengthen individuals' confidence in their abilities, which subsequently promotes more positive behavioral and academic outcomes.

Furthermore, Benlahcene et al. (2024) demonstrated that support and positive feedback from the social environment are among the primary sources of self-efficacy development, which in turn contributes to individuals' engagement in academic activities. The consistency of these findings suggests that social support plays an important role not only in directly promoting student engagement but also in indirectly enhancing engagement through the development of self-efficacy. Therefore, students who receive adequate support from parents, teachers, and peers are more likely to develop stronger confidence in their abilities, which subsequently encourages greater participation, persistence, and involvement in the learning process.

The findings of this study suggest that improving student engagement cannot be achieved solely through the provision of social support but also through the enhancement of self-efficacy as a psychological factor underlying students' involvement in learning. Support provided by parents, teachers, and peers can help students develop stronger beliefs in their capabilities, enabling them to become more confident, persistent in overcoming difficulties, and actively engaged in various academic activities. Therefore, efforts to enhance student engagement should adopt an approach that simultaneously addresses both environmental and personal factors.

Based on the findings of this study, social support had a positive and significant effect on both self-efficacy and student engagement among students. Self-efficacy was also found to have a positive and significant effect on student engagement. Furthermore, self-efficacy served as a partial mediator in the relationship between social support and student engagement. These findings indicate that student engagement can be enhanced through strengthening social support from parents, teachers, and peers, as well as by fostering students' self-efficacy.

The results of this study demonstrate that student engagement is influenced not only by students' internal factors but also by the social support provided by their surrounding environment. Therefore, schools should strive to create a supportive learning environment by strengthening support from teachers, parents, and peers. In addition, programs focused on enhancing self-efficacy, such as providing positive feedback, reinforcing motivation, and offering academic guidance, may serve as effective strategies for increasing students' engagement in learning. Consequently, the synergy between social support and the enhancement of self-efficacy is expected to promote higher levels of student engagement and optimize students' academic success.

This study provides insights into the roles of social support and self-efficacy in influencing student engagement. However, the findings are limited to the characteristics of the respondents and the variables examined in this study. Therefore, future research is recommended to involve larger and more diverse samples to improve the generalizability of the findings. Additionally, further investigation of other variables that may influence student engagement is needed to obtain a more comprehensive understanding of students' involvement in the learning process.

Conclusions

This study examined the mediating role of self-efficacy in the relationship between social support and student engagement among senior high school students at SMA Negeri 2 Kisaran. The findings showed that social support had a positive and significant direct effect on student engagement and an indirect effect through self-efficacy. In addition, self-efficacy was found to partially mediate the relationship between social support and student engagement, indicating that students who receive greater support from their social environment tend to develop stronger confidence in their abilities, which subsequently enhances their engagement in learning activities. The findings contribute to the literature by providing empirical evidence regarding the mediating mechanism linking social support and student engagement among Indonesian senior high school students. While previous studies have largely focused on university students or examined direct relationships among these variables, the present study demonstrates that self-efficacy functions as an important explanatory mechanism in understanding how social support influences student engagement in the context of secondary education. Therefore, the findings extend existing evidence by highlighting the relevance of this mediating relationship among senior high school students in Indonesia. The findings of this study should be interpreted within the context of several limitations. First, the participants were drawn from a single public senior high school, which may limit the generalizability of the findings to students from other schools, regions, or educational settings. Second, the cross-sectional design does not permit causal conclusions regarding the relationships among social support, self-efficacy, and student engagement. Third, although the proposed model explained a substantial proportion of the variance in student engagement, other potentially relevant factors, such as learning motivation,

school climate, teacher support, and psychological well-being, were not included in the model. Future research is encouraged to involve more diverse samples from different schools and regions to improve the generalizability of the findings. In addition, longitudinal studies are recommended to examine whether changes in social support precede changes in self-efficacy and student engagement over time, thereby providing stronger evidence regarding the temporal ordering and potential causal mechanisms underlying these relationships. Such designs may offer a more comprehensive understanding of how students' engagement develops throughout their educational experiences.

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