Journal of Learning and Development Studies
ISSN: 2752-9541
DOI: 10.32996/jlds
Journal Homepage: www.al-kindipublisher.com/index.php/jlds

JLDS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Academic Self-Efficacy as a Full Mediator Between Perceived Social Support and Mathematics Interest Among Vocational Students in Computer and Network Engineering

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| ABSTRACT
This study examines the impact of perceived social support on the academic interest in mathematics among vocational high school students, as academic interest is a crucial determinant of engagement and success in learning mathematics. For students in Computer and Network Engineering (TKJ), mathematics is crucial for logical reasoning and technological problem-solving; nonetheless, many exhibit just modest motivation for the subject. Although there is increasing evidence that social support enhances favorable academic achievements, there is insufficient research elucidating the psychological process that connects support to interest in mathematics within vocational education contexts. This study demonstrates that academic self-efficacy fully mediates the association between perceived social support and interest in mathematics. Data were obtained from 260 TKJ vocational students utilizing a quantitative correlational design with a mediation model, employing validated questionnaires and evaluated through regression-based mediation testing. The findings indicated that perceived social support was a significant predictor of academic self-efficacy ($\beta = 0.672$, $p < .001$), and academic self-efficacy was a strong predictor of mathematics interest ($\beta = 0.596$, $p < .001$). The indirect impact was significant ($\beta = 0.359$, $p < .001$) and constituted 93.40% of the overall effect, whereas the direct effect was non-significant ($\beta = 0.026$, $p = .213$), so demonstrating full mediation. The findings suggest that initiatives to increase mathematics interest in vocational schools should focus on bolstering students' academic self-efficacy through continuous social support from family, peers, and educators.

| KEYWORDS
Perceived social support; academic self-efficacy; mathematics academic interest; vocational students; mediation model.

| ARTICLE INFORMATION

ACCEPTED: 01 January 2026 **PUBLISHED:** 15 January 2026 **DOI:** 10.32996/jlds.2026.6.2.1

1. INTRODUCTION

The enthusiasm in mathematics is acknowledged as a vital motivational factor that influences students' involvement in learning, perseverance, and academic achievement. In modern educational psychology, interest is not simply a fleeting curiosity, but a complex psychological state encompassing emotional satisfaction, perceived significance, cognitive commitment, and prolonged involvement in a learning area. Students that cultivate a profound interest in mathematics typically exhibit increased effort, enhanced conceptual understanding, and better perseverance when confronted with challenging problems (Fernández-Martínez et al., 2017; Kornuta & Germaine, 2019; Pitzer & Skinner, 2016). In contrast, a lack of interest in mathematics frequently leads to disengagement, avoidance behaviors, and diminished accomplishment trajectories, especially in subjects seen as abstract or anxiety-provoking (Fasasi, 2017; Gartland et al., 2019; Rakesh et al., 2024). Consequently, interest in mathematics has emerged as a primary concern for researchers and policymakers aiming to enhance educational achievements and long-term academic trajectories.

This issue is particularly pertinent in developing nations, where the quality of mathematics education consistently encounters significant obstacles. Global evaluations, including the Programme for International Student Assessment (Jihannita et al., 2024; Sharma, 2023; Strang, 2008). In numerous educational institutions, enhancing mathematics performance is often pursued through curriculum modification and instructional change; yet, psychological factors such as curiosity, confidence, and

social learning environment are equally crucial predictors of enduring development. Mathematics learning should be perceived not merely as instructional delivery, but also as a socio-psychological process influenced by students' beliefs, emotions, and interactions within their educational context (Hwang & Kim, 2023; Nasution & Wahyuni, 2025; Trigueros et al., 2019).

Mathematics occupies a distinctive and crucial position in vocational education. Technical Secondary Schools. Notwithstanding its significance, numerous vocational students still regard mathematics as challenging, unimportant, or unconnected to their prospective career objectives (McIntyre-Mills & Romm, 2019; Rojewski & Sheng, 1993; Sulistiobudi & Kadiyono, 2023). Such beliefs may diminish their inclination to engage substantively with mathematical subject, potentially impacting their preparedness to acquire advanced technical skills.

Empirical research indicates that students' academic interest in mathematics diminishes across grade levels when they face recurrent academic challenges, insufficient instructional support, or adverse emotional experiences such as anxiety and diminished self-confidence (Ahmed et al., 2018; Pitzer & Skinner, 2016; Suud et al., 2023). Vocational students may face a more intricate problem as mathematics is sometimes regarded as a supplementary subject rather than a core vocational competency, resulting in some learners underestimating its significance (Lucas & Berkel, 2005; Putra, 2023; Rojewski & Sheng, 1993). In this context, comprehending the psychological and contextual aspects that can cultivate interest in mathematics is crucial, especially for students in vocational programs that depend significantly on mathematics-based reasoning.

A frequently recognized environmental factor linked to favorable academic achievement is perceived social support. Perceived social support denotes students' subjective assessment of the accessibility and quality of assistance from key sources, including family, classmates, and significant others (Li et al., 2017; Martínez-Cuevas et al., 2024; Özsaban et al., 2019; Tudor & Spray, 2017). Social support is regarded as a protective feature that aids learners in managing academic stress, fostering a sense of belonging, and sustaining motivation in demanding educational settings. Prior research indicates that students with elevated social support exhibit enhanced engagement and more favorable attitudes toward learning, particularly in STEM disciplines (Baskin et al., 2010; Fernández-Martínez et al., 2017; Hasan, 2021; Rahmadi et al., 2024). In the context of mathematics education, instructor encouragement, peer collaboration, and familial reinforcement can foster a psychologically safe environment in which pupils feel valued, encouraged, and capable of achieving progress.

The correlation between social support and intellectual interest is not invariably direct. Although social support offers external encouragement, students' internal psychological resources dictate the interpretation and conversion of such support into motivation and engagement. A crucial psychological factor that may elucidate this process is academic self-efficacy (Fatima et al., 2018; Fatimah et al., 2023; Zhao et al., 2021). Academic self-efficacy pertains to students' convictions on their ability to organize and perform the actions necessary for the successful completion of academic tasks. Self-efficacy is acknowledged as a significant predictor of academic persistence, utilization of learning strategies, and performance results. In mathematics education, self-efficacy affects students' perceptions of challenging activities, determining whether they view them as manageable obstacles or as threats to be evaded (Pendon, 2022; Sarac & Aslan-Tutak, 2017; Zakariya, 2022). Students possessing elevated academic self-efficacy are more inclined to persevere, explore problem-solving solutions, and sustain interest despite facing challenges.

Social support and academic self-efficacy are theoretically and empirically connected. Supportive environments may strengthen students' confidence through verbal persuasion, emotional reassurance, constructive feedback, and role modeling, which are known sources of efficacy beliefs. Recent evidence suggests that perceived social support positively predicts academic self-efficacy and can indirectly contribute to broader academic engagement outcomes (Artino, 2012; Gebauer et al., 2021; Hemade et al., 2024; Zhao et al., 2021). In other words, social support may not directly "create" academic interest; rather, it may function by nurturing students' beliefs that they are capable of learning, improving, and succeeding in mathematics. When students feel competent, interest becomes more likely to emerge because learning is perceived as meaningful, achievable, and personally rewarding.

Despite extensive discourse on the connections among social support, self-efficacy, and academic success, significant gaps persist. Initially, numerous prior studies have concentrated on broad student populations or mainstream academic pathways, but vocational education—particularly technical tracks like Computer and Network Engineering—has garnered relatively little focus in motivational research. Vocational students encounter unique learning requirements and identity orientations that may influence their approach to mathematics education (Muhrman, 2022; Putrawan et al., 2021). Secondly, the current literature frequently regards social support as a direct determinant of interest or engagement, without rigorously examining the psychological mechanisms by which support affects learning motivation (Leder & Grootenboer, 2005; Martínez-López et al., 2023). Third, research in the contexts of developing countries, such as Indonesia, is still scarce, notwithstanding the variations in cultural expectations, family engagement patterns, and vocational school frameworks that could affect social support and self-perceptions (McIntyre-Mills & Romm, 2019; Suyitno et al., 2023; Tentama et al., 2019). These constraints indicate the necessity for a context-sensitive model that elucidates the role of social support in fostering mathematics interest among vocational learners, namely via internal motivational processes.

Rectifying these deficiencies is crucial for both theoretical and pragmatic purposes. Testing a mediation model theoretically enhances comprehension of the interaction between social and psychological elements in influencing motivational

results in mathematics education. Identifying the predominant pathway can effectively inform initiatives in vocational schools. If social support predominantly affects mathematics interest via academic self-efficacy, programs should enhance support availability while also concentrating on bolstering students' confidence in academic competence through systematic guidance, feedback mechanisms, and collaborative efforts among peers, families, and schools.

This study demonstrates that academic self-efficacy serves as a complete mediator in the association between perceived social support and interest in mathematics among vocational students in Computer and Network Engineering. This study used a quantitative correlational methodology and regression-based mediation analysis to investigate the direct impact of perceived social support on interest in mathematics, alongside the indirect influence mediated by academic self-efficacy. This research, centered on Indonesian vocational students, enhances the existing literature on motivational psychology within vocational education and offers evidence-based recommendations for creating supportive learning environments that bolster self-efficacy and maintain students' engagement in mathematics. Ultimately, comprehending this process is anticipated to facilitate more effective educational practices that improve both mathematics learner engagement and vocational preparedness in technology-focused paths.

2. METHOD

2.1 Research Design

This study utilized a quantitative research methodology with a correlational and explanatory design to investigate the associations between perceived social support, academic self-efficacy, and interest in mathematics among vocational students. The research employed a mediation analytical model to examine the direct and indirect impacts of the independent variable on the outcome variable via a psychological mechanism. In this model, perceived social support (X) served as the predictor, academic self-efficacy (M) functioned as the mediating variable, and mathematics academic interest (Y) was designated as the dependent variable. The mediation approach elucidated how students' perceptions of social support may affect their interest in mathematics by reinforcing their beliefs in academic competence. The study was carried out in vocational high schools (Sekolah Menengah Kejuruan/SMK), concentrating on students in the Computer and Network Engineering (Teknik Komputer dan Jaringan/TKJ) curriculum, where mathematics is a fundamental subject underpinning technical skills.

2.2 Participants and Sampling

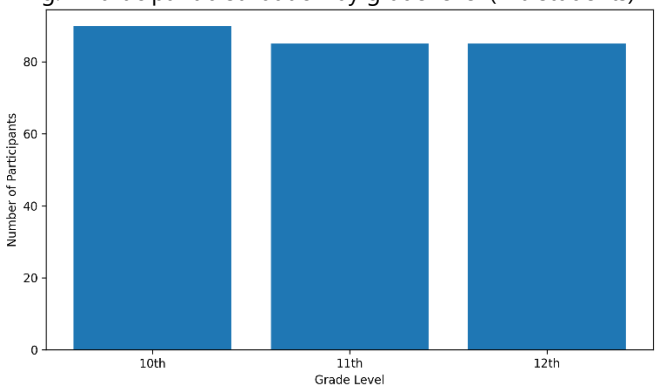
The target market comprised vocational high school students participating in the Computer and Network Engineering (TKJ) curriculum from Grades 10 to 12, generally aged 15 to 18 years. A total of 260 students (N = 260) engaged in this study. Participants were chosen by cluster random sampling, with clusters delineated by schools and/or class groups across several grade levels to provide sufficient representation. The inclusion criteria mandated that students be actively enrolled in the TKJ program and are undertaking mathematics as a requisite course. Responses with significant missing data or incomplete questionnaire responses were omitted from the final analysis to ensure data integrity.

Table 1. Participants and Sampling Summary

Component	Description
Population	Vocational high school students in Computer and Network Engineering (TKJ)
Grade Levels	10^{th}-12^{th} grade
Typical Age Range	15-18 years
Sample Size (N)	260 participants
Sampling Technique	Cluster random sampling
Cluster Basis	Schools and/or class groups (by grade level)
Inclusion Criteria	Active TKJ students; currently taking compulsory mathematics
Exclusion Criteria	Incomplete responses / missing data

This table encapsulates the participants and the sampling methodology employed in the study. The target market consisted of vocational high school students in the Computer and Network Engineering (TKJ) curriculum, encompassing Grades 10 to 12, typically aged 15 to 18 years. A total of 260 participants were enlisted to guarantee enough statistical power for mediation analysis. Cluster random sampling was utilized to improve representativeness by selecting groups based on schools and/or class-level clusters. The inclusion criteria stipulated that participants be active TKJ students presently enrolled in mathematics as a mandatory subject. Exclusion criteria were implemented to exclude incomplete or absent responses, hence enhancing data quality and reliability.

Fig. 1 Participant distribution by grade level (TKJ students)



This figure illustrates the distribution of participants among grade levels in the TKJ vocational program. The sample was deliberately balanced among Grades 10, 11, and 12 to capture changes in learning experiences and motivational growth throughout the vocational education pathway. Grade 10 comprises the highest percentage of respondents, although Grades 11 and 12 offer similar representation, hence facilitating cross-level generalizability. This distribution enhances the explanatory power of the mediation model by preventing conclusions from being excessively influenced by a singular grade cohort. The graphic illustrates a systematic and representative sample composition according with the principles of cluster random sampling.

2.3 Data Collection Procedure

Data collection was executed in collaboration with school authorities and mathematics educators to provide efficient administration and participant accessibility. The questionnaires were disseminated through an online survey format utilizing Google Forms, facilitating effective data collection across several class groups. Before participation, students were provided with a concise overview of the study's aims, procedures, and the significance of truthful responses. Participants thereafter gave informed consent, affirming their voluntary participation and their entitlement to withdraw at any moment without repercussions. Upon obtaining consent, students completed the questionnaire in around 15 to 20 minutes. All replies were gathered anonymously, securely archived, and utilized exclusively for research purposes to uphold confidentiality and ethical standards.

2.4 Ethical Considerations

Ethical considerations were meticulously addressed throughout the study. Authorization to undertake the research was secured from the pertinent school administration before data collecting commenced. All participants were apprised of the study's aims, procedures, and their responsibilities as responses. Informed consent was acquired from students, and parental or guardian consent was sought as mandated by school policy. Participants were guaranteed that their comments would be confidential and anonymous, with no identifying information recorded. The data were utilized only for scholarly research and securely stored to avert illegal access. Students were advised of their right to withdraw from the study at any moment without consequence.

3. RESULTS

3.1 Overview of Data Analysis

This part systematically presents the statistical data of the study to answer the research objectives and evaluate the proposed mediation model. The data analysis commenced with descriptive statistics to delineate the overall characteristics of key variables, including perceived social support, academic self-efficacy, and interest in mathematics among vocational students in the Computer and Network Engineering (TKJ) program. Means and standard deviations were computed to characterize the overall tendency and variability of each construct within the sample.
A Pearson correlation analysis was performed to investigate the bivariate correlations among the research variables and to provide initial indications of significant linkages aligned with the expected model. This stage facilitated the discovery of the strength and direction of correlations among perceived social support and academic self-efficacy, perceived social support and interest in mathematics, and academic self-efficacy and interest in mathematics.

Following the establishment of significant correlations, the study advanced to regression analysis to evaluate the direct predictive relationships within the mediation framework. Regression models were employed to assess the impact of perceived social support on academic self-efficacy (route a), the influence of academic self-efficacy on mathematics academic interest (way b), and the overall effect of perceived social support on mathematics interest (path c). Mediation testing was ultimately

performed to assess the indirect influence of perceived social support on academic motivation in mathematics via academic self-efficacy. Statistical significance was assessed using a standard criterion of $p < .05$.

3.2 Descriptive Statistics of Study Variables

Table 2 displays the descriptive statistics for the primary study variables: perceived social support (X), academic self-efficacy (M), and mathematics academic interest (Y). The empirical mean ratings for all variables exceeded their corresponding hypothetical means, suggesting that students predominantly indicated favorable psychosocial and motivational conditions. Perceived social support exhibited an empirical mean of 61.27 (SD = 8.42), surpassing the hypothetical mean of 48, indicating that TKJ students encountered a moderate to high degree of support from family, friends, and important others. Academic self-efficacy had a robust profile, with an actual mean of 134.85 (SD = 15.63) in contrast to a hypothetical mean of 112, indicating moderate to high confidence in managing academic activities. The empirical mean of mathematics academic interest was 66.91 (SD = 9.18), just exceeding the ideal mean of 60, suggesting a moderate level of interest in mathematics among vocational students.

Table 2. Descriptive Statistics of Study Variables

Variable	Hypothetical Mean	Empirical Mean	SD	Interpretation Level
Perceived Social Support (X)	48	61.27	8.42	Moderate-High
Academic Self-Efficacy (M)	112	134.85	15.63	Moderate-High
Mathematics Academic Interest (Y)	60	66.91	9.18	Moderate

Fig 2. Profile of Study Variables: Empirical vs Hypothetical Means

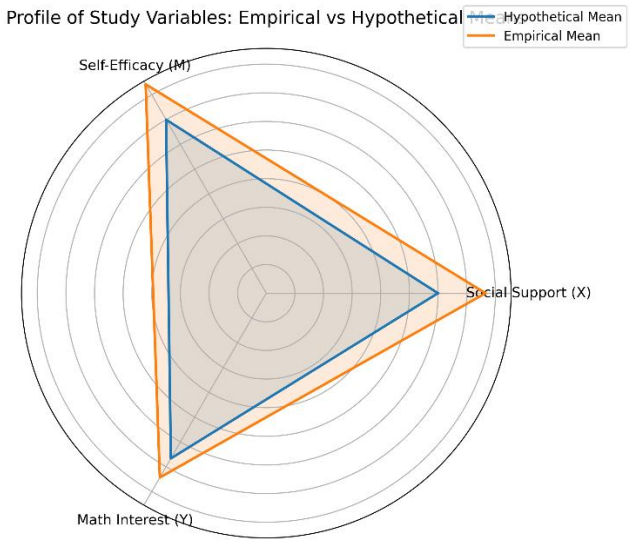


Figure 2 presents a unique visual representation contrasting hypothetical and empirical mean scores across the three study constructs. The enlarged empirical polygon demonstrates that students' reported levels of perceived social support, academic self-efficacy, and interest in mathematics consistently exceeded the baseline hypothetical values. The greatest significant rise is shown in academic self-efficacy, indicating that students mostly view themselves as competent in handling academic obstacles. Perceived social support demonstrates a significant increase, indicating the existence of substantial support networks. Interest in mathematics reveals a modest yet affirmative variance, signifying moderate enthusiasm for learning mathematics. The chart illustrates a balanced incentive pattern conducive to mediation model testing.

3.3 Correlation Analysis Among Variables

Table 3 displays the Pearson association findings among perceived social support (X), academic self-efficacy (M), and mathematical academic interest (Y). The results demonstrate that all variables exhibited a positive correlation, hence validating the proposed mediation framework. Perceived social support had a robust positive link with academic self-efficacy ($r = 0.672$), indicating that students who recognized elevated levels of support from family, classmates, and significant others generally reported greater confidence in handling academic responsibilities. This robust correlation underscores the significance of nurturing social contexts in influencing students' academic convictions.

Academic self-efficacy exhibited a moderate to high positive connection with interest in mathematics (r = 0.596). This outcome suggests that students possessing elevated self-efficacy were more inclined to exhibit increased interest and engagement in mathematics study, highlighting the motivational function of competence beliefs.

Furthermore, perceived social support had a moderate correlation with academic interest in mathematics (r = 0.385). This association, however smaller than other correlations, indicates that social support influences mathematics interest, potentially through internal psychological mechanisms rather than direct effects. The observed correlation patterns substantiate the need for regression-based mediation analysis to investigate the indirect relationship between perceived social support and mathematics academic interest via academic self-efficacy.

Table 3. Correlation Matrix (Pearson r)

	Perceived Social Support (X)	**Academic Self-Efficacy (M)**	**Mathematics Academic Interest (Y)**
Perceived Social Support (X)	1	0.672	0.385
Academic Self-Efficacy (M)	0.672	1	0.596
Mathematics Academic Interest (Y)	0.385	0.596	1

Fig. 3. Correlation Heatmap with Effect-Size Labels (Pearson r)

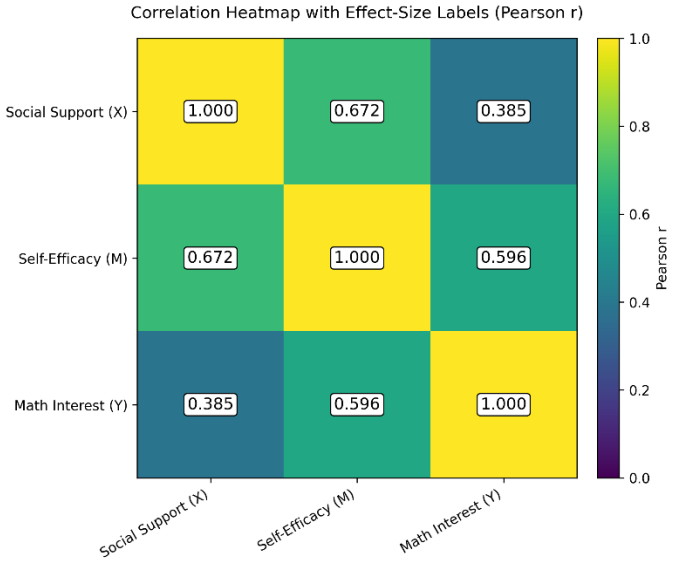


Figure 3 presents a detailed visual representation of the Pearson correlation coefficients among perceived social support (X), academic self-efficacy (M), and mathematics academic interest (Y). Each cell presents the precise effect size label (r value), facilitating rapid interpretation while ensuring statistical transparency. A robust correlation exists between social support and academic self-efficacy (r = 0.672), signifying a strong positive relationship between supportive surroundings and students' confidence in their academic abilities. Academic self-efficacy exhibits a moderate to significant connection with interest in mathematics (r = 0.596), underscoring its motivational significance. The moderate connection between social support and interest in mathematics (r = 0.385) substantiates a mediation-based view.

3.4 Regression Results (Direct Effects Testing)

Table 4 encapsulates the regression outcomes for the direct impacts examined inside the mediation framework. Initially, perceived social support was a significant predictor of academic self-efficacy (Path a), with a standardized coefficient of β = 0.672, t = 14.98, and p < .001, accounting for 45.1% of the variance (R^2 = 0.451). This suggests that increased perceived support from family, friends, and significant others is significantly correlated with enhanced academic confidence among TKJ students. Secondly, academic self-efficacy was a significant predictor of mathematics academic interest (Path b), with β = 0.596, t = 12.01, and p < .001, explaining 35.5% of the variation in mathematics interest (R^2 = 0.355). This discovery substantiates that students' self-assurance in their academic capabilities significantly influences their interest in mathematics. Ultimately, perceived social support exhibited a substantial total effect on mathematics interest (Path c), with β = 0.385, t = 6.56, p < .001, and R^2 = 0.148, signifying a moderate predictive influence before the inclusion of the mediator.

Table 4. Regression Summary (Direct Effects: Paths a, b, c)

Path	Predictor → Outcome	β	t	p	R^2
a	Perceived Social Support (X) → Academic Self-Efficacy (M)	0.672	14.98	< .001	0.451
b	Academic Self-Efficacy (M) → Math Academic Interest (Y)	0.596	12.01	< .001	0.355
c (total effect)	Perceived Social Support (X) → Math Academic Interest (Y)	0.385	6.56	< .001	0.148

Fig. 4. **Direct Effects in the Mediation Model (Regression Paths a, b, c)**

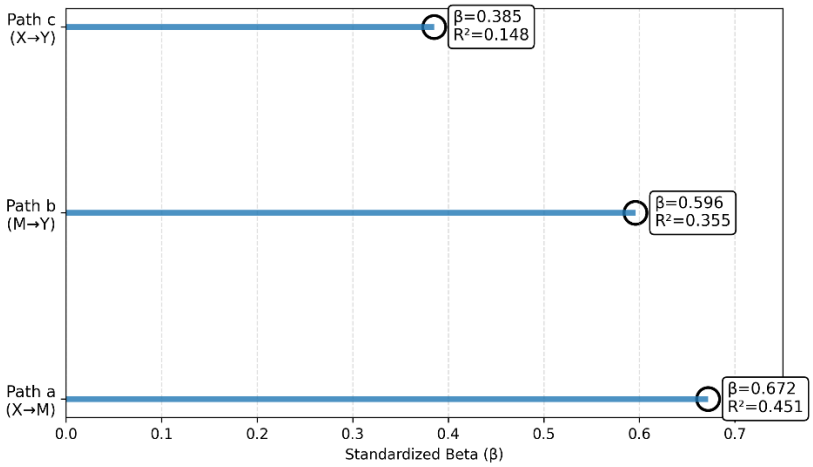


Figure 4 illustrates the standardized beta coefficients (β) for the three straight regression lines in the mediation model, with each point labeled by its respective R^2 value. Path a (X→M) demonstrates the most substantial predictive influence (β = 0.672), signifying that perceived social support is a significant predictor of academic self-efficacy. Path b (M→Y) exhibits a significant effect (β = 0.596), affirming that self-efficacy considerably influences mathematics interest. Path c (X→Y) exhibits a moderate overall impact (β = 0.385) before the inclusion of the mediator, indicating that social support alone accounts for less variance in interest than the efficacy pathway. The graphic underscores the preeminence of self-efficacy-related benefits.

3.5 Mediation Analysis Results

Table 5 displays the mediation analysis findings investigating whether academic self-efficacy (M) mediates the association between perceived social support (X) and mathematics academic interest (Y). The investigation examined the indirect pathway X → M → Y, in addition to the total and direct impacts. The findings demonstrate that the overall effect (c) of perceived social support on mathematics interest was statistically significant (β = 0.385, p < .001), indicating that greater perceived support correlated with heightened academic interest in mathematics in the absence of the mediator.

Upon the inclusion of academic self-efficacy in the model, the direct effect (c′) of perceived social support on mathematics interest was rendered non-significant (β = 0.026, p = .213). This research indicates that perceived social support does not directly affect mathematics interest when accounting for students' academic self-efficacy.

The indirect effect (a*b) via academic self-efficacy was statistically significant (β = 0.359, p < .001), indicating that social support predominantly boosts mathematics interest by bolstering students' academic confidence. The mediation data indicate that the indirect pathway constituted 93.40% of the total effect, whilst the direct channel contributed merely 6.60%.

Table 5. Mediation Effects (X → M → Y)

Effect Type	**β**	**p-value**	**Percentage of Total Effect**
Direct Effect (c')	0.026	0.213	6.60%
Indirect Effect (a*b)	0.359	< .001	93.40%
Total Effect (c)	0.385	< .001	100%

Fig. 5. Mediation Model Diagram with Standardized Betas

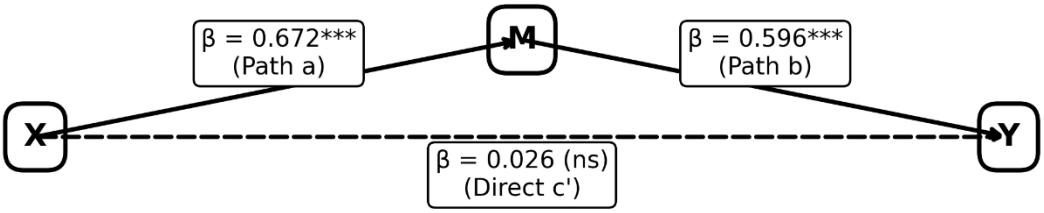


Figure 5 illustrates the mediation model with standardized beta coefficients, emphasizing the process by which perceived social support affects academic motivation in mathematics. The most robust relationship is between perceived social support (X) and academic self-efficacy (M) ($\beta = 0.672$, $p < .001$), suggesting that supportive social contexts significantly enhance students' academic confidence. Academic self-efficacy strongly predicts mathematics interest (Y) ($\beta = 0.596$, $p < .001$), affirming its essential motivational function. The direct relationship between social support and mathematics interest (c') is rendered non-significant ($\beta = 0.026$, ns), illustrated by a dashed line. This visual pattern unequivocally substantiates the conclusion of complete mediation.

4. DISCUSSION

4.1 Summary and Interpretation of Main Findings

This study aimed to investigate the relationships between perceived social support, academic self-efficacy, and mathematical academic interest among vocational students in the Computer and Network Engineering (TKJ) program, specifically to identify the psychological mechanisms underlying these associations. The study specifically examined a mediation model in which perceived social support was anticipated to affect mathematics academic interest both directly and indirectly via academic self-efficacy.

The results demonstrate that academic self-efficacy is a major explanatory factor in this process. Perceived social support was significantly correlated with elevated academic self-efficacy, suggesting that students who experienced support from family, classmates, and significant others were more likely to cultivate greater confidence in their academic ability. Academic self-efficacy substantially predicted interest in mathematics, indicating that students' confidence in their academic capabilities is a crucial motivational element that promotes enduring engagement in mathematics education (Kaleva et al., 2023; Kurniawati & Noviani, 2022).

The mediation study demonstrated that academic self-efficacy completely mediated the association between perceived social support and interest in mathematics. The direct impact of social support on mathematics interest was rendered non-significant upon controlling for self-efficacy, however the indirect effect persisted as robust and statistically significant (Ahmed et al., 2008; Casas & Blanco-Blanco, 2017; Rice et al., 2012). This outcome indicates that social support enhances mathematics interest mostly by bolstering students' efficacy beliefs, rather than by directly influencing interest independently.

4.2 Discussion of Descriptive Findings

The findings reveal that vocational students in the Computer and Network Engineering (TKJ) program exhibited moderate to high levels of perceived social support and academic self-efficacy, although their interest in mathematics remained modest. This pattern indicates that students typically encounter helpful social contexts and maintain a moderate level of confidence in handling academic challenges. Nonetheless, their enthusiasm for mathematics has not attained a comparably robust degree, suggesting that motivational engagement may remain tenuous and contingent upon circumstance.

The findings can be elucidated by the distinctive attributes of the TKJ occupational setting. Vocational students frequently regard mathematics as a formidable and abstract discipline, thus hindering enjoyment and prolonged involvement. Simultaneously, mathematics is a crucial foundational element for cultivating logical reasoning, problem-solving, and computational thinking, all pertinent to technical proficiencies in computer and networking domains. Consequently, students may acknowledge the significance of mathematics yet encounter challenges in cultivating a robust intrinsic motivation due to perceived difficulty or previous adverse learning experiences (Lee et al., 2023; Susanti et al., 2023).

Furthermore, the moderate to high social support scores indicate the existence of helpful networks; nevertheless, the quality and intensity of support may differ among sources. Inconsistent family encouragement, peer collaboration, and teacher direction among kids may elucidate the moderate interest in mathematics, despite generally favorable support and efficacy levels (Wang et al., 2024; Zakariya, 2022).

4.3 Social Support as a Predictor of Academic Self-Efficacy

This study's results indicate that perceived social support is a strong predictor of academic self-efficacy among TKJ vocational students. This conclusion theoretically corresponds with socio-cognitive perspectives, indicating that efficacy beliefs are developed through social interactions and environmental feedback rather than in isolation. When students have encouragement, reassurance, and constructive assistance from significant individuals, they are more inclined to perceive academic problems as surmountable and to have confidence in their capacity to succeed. Social persuasion, including verbal encouragement and affirmative feedback, can enhance students' confidence, while emotional reinforcement offers psychological comfort that mitigates fear of failure and fosters persistence in learning.

This outcome aligns with previous empirical evidence. Chun-mei et al. (2025) and Fatima et al. (2018) indicated that perceived social support enhances academic outcomes via motivational mechanisms, such as self-efficacy. Wang et al. (2024) and Zhang & Qian (2024) similarly discovered that social support and academic self-efficacy collaboratively augment learning engagement and educational outcomes, highlighting the significance of supportive interactions in bolstering students' competency views. Martínez-López et al. (2023) and Zhang & Qian (2024) corroborated that social support significantly impacts academic performance via self-efficacy and associated engagement processes, hence increasing the strength of this relationship across many contexts.

In the TKJ vocational context, familial encouragement and peer support may be especially impactful. Students who receive help at home and engage in collaborative peer interactions are more inclined to cultivate confidence in tackling mathematical activities, even when the topic is deemed challenging.

4.4 Academic Self-Efficacy as a Predictor of Mathematics Interest

This study's findings demonstrate that academic self-efficacy significantly predicts mathematics academic motivation among TKJ vocational students. This relationship can be elucidated through a motivational mechanism wherein confidence enhances perseverance, persistence amplifies opportunities for successful experiences, and recurrent success fosters enjoyment and deeper engagement, finally cultivating persistent interest. Students who possess confidence in their ability to manage academic assignments are more inclined to exert effort, explore alternate techniques, and maintain engagement when confronted with difficult mathematics problems. Over time, this adaptive persistence diminishes avoidance behavior and enhances positive emotional experiences, facilitating the development and growth of interest in mathematics.

This conclusion is corroborated by prior studies highlighting the key role of self-efficacy in influencing learning motivation and interest. Artino (2012) and Basileo et al. (2024) indicated that academic self-efficacy is significantly correlated with task significance and interest, emphasizing that confidence enhances students' propensity to participate in learning activities. Liu et al. (2024) and Pendon (2022) identified a significant correlation between self-efficacy and mathematics performance, indicating that efficacy beliefs influence both achievement and motivational orientation. Additionally, Amien et al. (2023) and Muhtadi et al. (2022) conducted meta-analyses within the Indonesian setting, establishing a robust correlation between self-efficacy and mathematical proficiency as well as learning outcomes, so underscoring its significance in mathematics education.

In vocational education, self-efficacy is crucial as it enables students to link mathematics with the technical problem-solving requirements in computer and networking disciplines, hence enhancing the significance and motivation of mathematics learning.

4.5 Full Mediation Effect: Why Support Works Through Self-Efficacy

This study's principal contribution is the discovery that academic self-efficacy completely mediates the connection between perceived social support and interest in mathematics. This finding indicates that social support alone does not immediately increase students' interest in mathematics unless it effectively bolsters their confidence in academic abilities (Leder & Forgasz, 2006; Leder & Grootenboer, 2005). Encouragement from family, peers, or significant others may offer emotional support and motivation; nevertheless, it only significantly influences interest in mathematics when it fosters students' views in their ability to comprehend, solve, and excel in mathematical activities. In the absence of confidence-building, assistance may stay superficial and fail to effectuate significant improvements in students' motivated engagement.

This discovery corresponds with motivational frameworks that highlight the role of social and contextual factors in influencing internal psychological processes. Social factors, including supportive relationships and favorable learning environments, influence students' interest and engagement by affecting self-perceptions, beliefs in competence, and expectancy-related evaluations (Rattan et al., 2015; Wentzel & Wigfield, 1998). Academic self-efficacy serves as a fundamental motivational concept that influences students' attitude to mathematics, determining whether they engage with tenacity and curiosity or with avoidance and disengagement.

The comprehensive mediation pattern identified in this study aligns with previous mediation research. Ahmed et al. (2010) indicated that perceived social support influences academic performance via motivational beliefs and emotional processes, emphasizing indirect pathways over direct effects (Fullerton et al., 2021; Sahil & Hashim, 2011). Esentürk et al. (2025) also illustrated that social support affects engagement via psychological mediators, underscoring the significance of internal

belief systems as the principal mechanism by which support influences learning motivation (Phan & Ngu, 2021; Tang & He, 2023).

5. CONCLUSION

This study investigated how perceived social support affects mathematics academic interest in vocational high school students enrolled in the Computer and Network Engineering (TKJ) program, emphasizing the mediation effect of academic self-efficacy. Comprehending this link is crucial, as mathematics is a fundamental discipline for technical problem-solving and computational reasoning; however, vocational students frequently express diminished desire and involvement in mathematics education.

The results demonstrate a robust correlation between perceived social support and academic self-efficacy, implying that kids who experience support from family, classmates, and significant others are likely to cultivate greater confidence in handling academic challenges. Academic self-efficacy strongly forecasts mathematics academic interest, underscoring that students' confidence in their academic abilities is crucial for maintaining motivation, persistence, and engagement in mathematics. Mediation research demonstrated that academic self-efficacy serves as a complete mediator between perceived social support and interest in mathematics. The direct influence of social support on mathematical interest became non-significant when self-efficacy was considered, however the indirect pathway persisted robustly, suggesting that social support largely enhances mathematics interest by bolstering students' efficacy beliefs.

These findings yield significant consequences for vocational education practice. Interventions designed to augment interest in mathematics should focus on tactics that bolster academic self-efficacy, including structured feedback, mastery-oriented learning experiences, peer collaboration, and ongoing support from families and educators. Subsequent research could advance this study by utilizing longitudinal designs to investigate temporal changes in self-efficacy and interest, assessing intervention strategies to enhance efficacy beliefs, and examining further moderating variables such as mathematics anxiety, gender disparities, or the quality of teacher support. Such studies would enhance evidence-based techniques for augmenting mathematics motivation and learning results in vocational contexts.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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