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Academic self-efficacy and teacher social support as predictors of academic flow mathematics among senior high school students in Jambi City

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ABSTRACT

Many senior high school students face challenges in situations that require mathematical skills, often resulting in low interest and discomfort in learning mathematics. This study aims to examine the influence of academic self-efficacy and teacher social support on academic flow in the context of mathematics learning among high school students. Employing a quantitative ex-post facto design, the study involved 420 students selected through a probability sampling method using a multistage cluster random sampling technique, due to the large population size. Data were collected using modified instruments: the Flow Perceptions Questionnaire (FPQ), the Academic Self-Efficacy Scale, and the Foreign Language Teacher Support Scale (FLTSS). Data analysis was conducted using prerequisite tests and multiple regression analysis. The findings revealed that both academic self-efficacy and teacher social support significantly predict students' experience of academic flow in mathematics learning. Students who possess strong confidence in their academic capabilities and receive substantial social support from teachers are more likely to engage positively in mathematics learning through the experience of academic flow. These results highlight the importance of fostering students' academic self-efficacy and enhancing the quality of teacher support to optimize academic flow in mathematics education.

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KEY WORDS:

academic flow; academic self-efficacy; teacher social support; mathematics; high school student

Introduction

The work environment is one of the main determinants of organizational success, because it reflects the conditions that support or hinder the implementation of employee duties and responsibilities (Siedler & Idczak-Paceś, 2021). A conducive work environment, characterized by comfort, safety, and emotional support, can motivate employees to work more optimally, thus contributing to increased productivity and achievement of company goals (Vanessa & Nawawi, 2022). Conversely, an unsupportive work environment, as characterized by a monotonous, inflexible, or even toxic work atmosphere, has the potential to lead to job dissatisfaction, psychological distress, and decreased employee performance. These conditions, if not addressed immediately, can increase turnover rates that are detrimental to the organization (Balqist et al., 2023).

Teaching and learning activities involve several stages, from receiving, reviewing, understanding, to evaluating material to ensure students understand and apply knowledge in assignments and exams and mathematics is no exception (Orakcı, 2021). Mathematics is a basic subject that has links with other disciplines and daily life, and is an important and compulsory subject to be studied at every level of education in Indonesia (Onoshakpokaiye, 2023). According to Cano dan Lomibao (2023), by learning and understanding mathematical concepts, students will be able to view mathematics as learning that has relevance both in classroom learning and outside the classroom, and be able to sharpen their thinking skills in facing complex challenges, especially for students at the high school level.

High school students who are active in learning usually show high concentration, feel comfortable, engage enthusiastically, and have strong internal motivation (Yuwanto, 2018). This state is called academic flow, where students show strong concentration, internal motivation, and a sense of comfort (Nastiti et al., 2023). Egbert (2004) explained that flow consists of four main aspects of the

eight aspects outlined by Csikszentmihalyi (1990), namely challenge and skills, attention, interest, and control. Challenges and skills include a balance between high challenge and high skill, which is optimal for achieving flow, whereas imbalance results in anxiety or boredom. Attention refers to full concentration that ignores distractions, with clear goals and feedback helping to focus concentration. Interest includes an interest in the activity that elicits intrinsic motivation, making the individual immersed in the activity and time seem to pass quickly. Control is the ability to control learned skills, as well as the balanced regulation of thoughts, emotions, behavior and attention, all of which together enable the achievement of flow states.

Academic flow conditions make it easier for students to overcome learning challenges because they are more concentrated, active, and able to control their actions while learning (Adil et al., 2020; Kim & Kim, 2021). Academic flow also has a positive impact on students' academic success (Özhan & Kocadere, 2020). Academic flow is a crucial element in learning mathematics. When students achieve flow, they feel comfortable and fully engaged, and are therefore more likely to successfully complete mathematical tasks (Ljubin-Golub et al., 2018). Increased academic flow, including full concentration, comfort, and active engagement, contributes greatly to optimal achievement in mathematical skills (Wang et al., 2023). Students who experience academic flow in learning mathematics will experience long-term increases in engagement with mathematics (d'Entremont & Voillot, 2021).

In Indonesia, there are a number of problems in learning mathematics, one of which is the low ranking of mathematics skills in international evaluations such as PISA. In PISA 2018, 33% of Indonesian students found it difficult to solve maths problems, placing Indonesia 73rd out of 78 countries with a score of 379, far below the international average of 487 (Rastuti & Prahmana, 2021; Syamsyiah & Handayani, 2023). In PISA 2022, Indonesian students' maths score decreased to 366, while the international score dropped to 466 (Kemendikbud, 2023). OECD data shows that around 71% of Indonesian students have not reached the required level of mathematics competence (Wuryanto & Abduh, 2022). To strengthen the assumption, the researcher conducted an initial study on 200 Jambi City high school students on 4 September 2023 by distributing questionnaires through Google Form. The results showed that 57% of students did not enjoy learning mathematics. They felt bored, unsettled, difficult to focus, and considered maths complicated, boring, and uninteresting. They feel that the lessons take too long, they are not sure they understand the teacher's explanation,

and they lack emotional support from the teacher. These problems indicate that students have not experienced academic flow in mathematics.

Based on preliminary data, the low academic flow of high school students in learning mathematics is caused by internal and external factors. According to Csikszentmihalyi (1990), flow is influenced by internal (person) and external (environmental) factors. Preliminary data shows that high school students experience academic self-efficacy problems, namely a lack of confidence in their ability in mathematics, thus reducing interest in learning. Therefore, this study focuses on academic self-efficacy as an internal factor that affects the experience of academic flow (Markamad & Khuzaemah, 2019).Academic self-efficacy is a student's belief in his or her ability to succeed in learning tasks (Alhadabi & Karpinski, 2020). According to Bandura (1997) theory, academic self-efficacy consists of three aspects: level, generality, and strength. Level describes the extent to which individuals believe they are able to overcome task difficulties, with self-efficacy varying depending on the difficulty of the task at hand. Generality relates to self-evaluation of self-efficacy in various activities, which is reflected in students' behaviour, cognitive and emotional aspects. Strength refers to how strong an individual's belief in their own ability is, where low self-efficacy makes students easily affected by anxiety, whereas high self-efficacy encourages them to persist in their endeavours.

High school students with high self-efficacy are better able to control their behaviour and focus on the task, increasing the likelihood of achieving academic flow (Wijayanti et al., 2021). People with high self-efficacy attribute failure to inadequate personal effort, thus being more motivated (Malureanu et al., 2021). Research shows that self-efficacy plays a positive role in increasing academic flow and reducing anxiety (Akyol & Kabasakal, 2023; Mao et al., 2020; Pantu, 2021; Shkëmbi & Treska, 2023). Thus, students who are confident in their mathematical abilities are more likely to feel fully engaged in learning, achieving optimal learning goals as they are more motivated, focused and persistent in understanding concepts and solving mathematical problems.

In addition to academic self-efficacy which is used by researchers as an internal factor of academic flow, from the initial data of high school students alluding to teachers who do not support high school students during mathematics learning, high school students feel the impression of a bad teacher, in addition to teachers who do not provide feedback expected by high school students make high school students even more reluctant to study mathematics, then researchers make teacher social support as an external factor that can help

high school students achieve academic flow. Teacher social support is an external factor that affects high school students' academic flow in learning mathematics. Through help, encouragement, and positive interactions, teachers help students overcome difficulties, strengthen self-confidence, and increase motivation to engage fully in learning (Prihastyanti & Sawitri, 2020).

This support creates an inclusive and supportive learning environment, allowing students to feel valued and supported in the process of learning mathematics (Purnawanto, 2023). Positive interactions between teachers and students, as well as providing constructive feedback, help students feel more comfortable and engaged in learning mathematics (Wulandari & Agustika, 2020). Previous research shows that teacher social support is positively correlated with students' academic flow (Hastiana & Hidayah, 2021; Novitasari et al., 2020), and has a 29% effect on increasing students' academic flow (Gu et al., 2022). Social support also provides comfort for students in carrying out academic activities, influencing academic flow (Suryaratri et al., 2022), and increases students' constructive feelings and self-confidence, which contribute to the emergence of academic flow (Jia & Cheng, 2022).

Based on the explanation above, there have been many studies on academic self-efficacy, teacher social support and academic flow. However, there is no research that simultaneously measures academic self-efficacy, teacher social support for academic flow in mathematics learning, especially at the high school level in Jambi City. So it can be concluded that the research to be carried out is relatively new and not much previous research has been done.

Method

Research Design

This study employed a non-experimental quantitative design of an ex-post facto nature, aiming to explore relationships among variables based on observed phenomena in the sample. As a retrospective study, it investigates the influence of independent variables (academic self-efficacy and teacher social support) on the dependent variable (academic flow) based on conditions that occurred prior to the research. The study seeks to determine causal relationships using empirical data collected in the field.

Sample

The target population consisted of all senior high school students in Jambi City, totaling 18,832 individuals (Sugiyono, 2013). A probability sampling

method with a multistage cluster random sampling technique was used due to the large population size (Doglikuu et al., 2023; Sugiyono, 2015). In the first stage, 11 sub-districts were randomized, and Alam Barajo sub-district was selected. In the second stage, two schools were randomly selected from five available schools in the area: SMAN 11 and SMA-IT Nurul Ilmi. Finally, classes were randomly selected from each school using cluster random sampling. The selected classes included X A, X E, XI MIPA 2, XI MIPA 3, and XII IPS 2 from SMA-IT Nurul Ilmi, and X E1, X E4, X E5, XI F2, XI F3, XI F5, XI F6, and XI F7 from SMAN 11. The final sample size was determined using the Slovin formula, resulting in 420 student participants (Adhikari, 2021).

Instruments

Data were collected using Likert-type scales with five response options: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. Three variables were measured: academic flow, academic self-efficacy, and teacher social support. The academic flow scale consisted of 14 items adapted from the Flow Perceptions Questionnaire (FPQ) developed by Egbert (2004). The academic self-efficacy scale contained 12 items based on *the Academic Self-Efficacy Scale* by Muthui and Mutweleli (2020), which draws upon Bandura's theory (1997). The teacher social support scale included 25 items modified *from the Foreign Language Teacher Support Scale (FLTSS)* by Sadoughi and Hejazi (2022), based on *The Social Support Theory* by Sarafino and Smith (2011).

Construct validity for all instruments was evaluated by expert reviewers from the Postgraduate Program in Educational and Developmental Psychology at Yogyakarta State University using Gregory's method. The academic flow and academic self-efficacy scales obtained a validity coefficient of 1.00, while the teacher social support scale achieved a coefficient of 0.96, indicating very high validity. Instrument reliability was tested on the full sample (N = 420), yielding Cronbach's alpha coefficients of .901 (academic flow), .769 (academic self-efficacy), and .934 (teacher social support), thus confirming high internal consistency.

Data Analysis

The data were analyzed using quantitative statistical methods. Normality testing was conducted on the residuals of the regression model to verify normal distribution, with data considered normal if $p > .05$ (Khatun, 2021). Multicollinearity was assessed using tolerance values and the variance inflation factor (VIF), where VIF > 10 indicates multicollinearity (Alita et al., 2021).

Heteroscedasticity testing was performed to ensure that residual variances were constant across the regression model (Rogers et al., 2020). Multiple regression analysis was employed to determine the effect of academic self-efficacy and teacher social support on academic flow. Analysis included the calculation of regression coefficients, the coefficient of determination (R^2), and the F-value, all evaluated at a significance level of .05. The multiple linear regression equation was used to model the relationship and evaluate predictive power.

Result

The data in this study were obtained through the distribution of research instruments in the form of questionnaires or questionnaires. The sample demographics are shown in Table 1.

Table 1
Subject Demographic Data

Demographic Data	N	Percentage
Gender		
Male	98	23.3%
Female	322	76.7%
Age		
14 years	1	.2%
15 years	120	28.6%
16 years	234	55%
17 years	65	15.5%
18 years	3	.7%

Based on Table 1, it is known that the number of male samples is 98 students (23.3%) and female samples dominate with a total sample of 322 students (76.6%). It is known that the age range of the research sample ranges from 14 years to 18 years. The sample is dominated by the age range of 15 years to 17 years, all of which have a percentage of the sample size above 10% with the most students being 16 years old, namely 234 students (55%). This study involves two independent variables and one dependent variable. The independent variables used are academic self-efficacy (X1) and teacher social support (X2), while the dependent variable in this study is academic flow (Y). Thus, the range of ideal scores obtained ranges from 18 to 90. Empirical and hypothetical data can be found in Table 2.

In Table 2, For academic flow, it can be seen that the minimum score of empirical data is 24 and the hypothetical data is 18, while the maximum score of empirical data is 87 and the hypothetical data is 90. The range value in the

empirical data is 63 and the hypothetical data is 72 with a mean or average value for empirical data and hypothetical data of 51.96 and 54, respectively. Finally, the standard deviation value of the empirical data is 11.41 and the hypothetical data is 12. For academic self-efficacy, it can be seen that the minimum score of empirical data and hypothetical data is 12, while the maximum score of empirical data is 52 and hypothetical data is 60. The range value in the empirical data is 40 and the hypothetical data is 48 with a mean or average value for empirical data and hypothetical data of 33.67 and 36, respectively. 43 and hypothetical data is 8. For teacher social support, it can be seen that the minimum score of empirical data is 29 and hypothetical data is 25, while the maximum score of empirical data and hypothetical data is 125. The range value in the empirical data is 96 and the hypothetical data is 100 with a mean or average value for empirical data and hypothetical data of 85.33 and 75, respectively. Finally, the standard deviation value of empirical data is 14.95 and hypothetical data is 16.67

Table 2
Descriptive Statistics Data

Variable Data	N	Range	Min	Max	Standard Deviation	Mean
Hypothetical						
Academic Flow	420	72	18	90	12	54
Academic Self-Efficacy	420	48	12	60	8	36
Teacher Social Support	420	100	25	125	16.67	75
Empirical						
Academic Flow	420	63	24	87	11.41	51.96
Academic Self-Efficacy	420	40	12	52	6.43	33.67
Teacher Social Support	420	96	29	125	14.95	85.33

In Table 3 For academic flow, it can be seen that 4.8% of the samples have very high academic flow scores, 17.9% of the samples have high academic flow scores, and as many as 42.8% of the samples with moderate academic flow scores, as well as 25.2% of the samples have low academic flow scores, finally 9.3% of the samples have very low academic flow scores. for academic self-efficacy, it can be seen that 2.6% of the samples have very high academic self-efficacy scores, 13.3% of the samples have high academic self-efficacy scores, and as many as 47. 2% of samples with moderate academic self-efficacy scores, and 31.7% of samples have low academic self-efficacy scores, finally 5.2% of samples have very low academic self-efficacy scores. for teacher social support, it can be seen that 15.7% of samples have very high teacher social support scores, 44.3% of samples have high teacher social support scores, and as many as 30.2% of

samples with moderate teacher social support scores, and 7.6% of samples have low teacher social support scores, finally 2.1% of samples have very low teacher social support scores

Table 3
Categorization of Academic Flow, Academic Self-Efficacy, and Teacher Social Support

Variable	Score	Amount	Category	Percentage
Academic Flow	$72 < x$	20	Very High	4.8 %
	$60 < x \leq 72$	75	High	17.9 %
	$48 < x \leq 60$	180	Medium	42.8 %
	$36 < x \leq 48$	106	Low	25.2 %
	$x \leq 36$	39	Very Low	5.2 %
Academic Self-Efficacy	$48 < x$	11	Very High	31.7 %
	$40 < x \leq 48$	56	High	47.2 %
	$32 < x \leq 40$	198	Medium	13.3 %
	$24 < x \leq 32$	133	Low	2.6 %
	$x \leq 24$	22	Very Low	5.2 %
Teacher Social Support	$100 < x$	66	Very High	15.7 %
	$83.3 < x \leq 100$	186	High	44.3 %
	$66.7 < x \leq 83.3$	127	Medium	30.2 %
	$50 < x \leq 66.7$	32	Low	7.6 %
	$x \leq 50$	9	Very Low	2.1 %

Table 4
Normality Test Results

	Statistics	Significance (P)	Description
Academic Flow	1.013	.256	Normal
Academic Self-Efficacy	1.033	.236	Normal
Teacher Social Support	.939	.324	Normal

In Table 4 shows normally distributed normality test results on each variable, with a significance value on academic flow worth .256, then on academic self-efficacy worth .236, and on teacher social support worth .324, which means that the three variables meet the normality test requirements with

the One-sample Kolmogorov Smirnov Test technique with a sig value of more than .05. Then the results of the Multicollinearity test can be seen in Table 5.

Table 5
Multicollinearity Test Results

Variable	Tolerance	VIF	Description
Academic Self-Efficacy	0.881	1.135	No multicollinearity
Teacher Sosial Support	0.881	1.135	No multicollinearity

In Table 5, based on the multicollinearity test results, the tolerance value obtained on the academic self-efficacy variable on academic flow is .881, and the teacher's social support for academic flow is .881, which means that the tolerance value of both can be said to have no multicollinearity problem (tolerance value is more than .01). Meanwhile, based on the results of the VIF (Variance Inflanction Factor) value, it shows the results that both are free from multicollinearity, namely the value of academic self-efficacy is 1.135 and teacher social support is 1.135, both of which are less than 10. So, based on the multicollinearity test, it is concluded that there is no multicollinearity in the data. The heteroscedasticity test is a prerequisite test that aims to test whether there is an inequality of variation from the residual value of one observation to another in the regression model. Ideally, a good regression model does not occur symptoms of heteroscedasticity, that is, if the variation value of the residual value of one observation and another is different. The results of the heteroscedasticity test are shown in table 6.

Table 6
Heteroscedasticity Test Results

Variable	Sig.	Description
Academic Self-Efficacy	.585	No heteroscedasticity
Teacher Sosial Support	.477	No heteroscedasticity

In Table 6, it can be seen that in this study there is no heteroscedasticity in the regression model with a significance value of more than .05, namely on academic sel-efficacy is .585 and on teacher social support is .477. So the results of the heteroscedasticity test show that the data fulfils the prerequisite test in the regression analysis model. Hypothesis testing in this study was conducted to prove the influence of academic self-efficacy and teacher social support on academic flow in high school students in learning mathematics. This study uses multiple linear regression analysis techniques to test the hypothesis, the results of hypothesis testing are shown in table 7.

In Table 7, Hypothesis testing is done by looking at the significance value of the analysis results The hypothesis is accepted if the significance value is smaller than 0.05 (sig. <0.05). Based on table 7, the significance value of .000 is smaller than .05 so that the hypothesis is accepted. Based on these results, academic self-efficacy and teacher social support simultaneously affect academic flow. Then, the results of the T test used to determine whether the independent variable (X) individually affects the dependent variable (Y) can be seen in Table 8.

Table 7
Multiple Linear Regression F test analysis results

Model	F	Sig.
Regression	151.599	.000

Table 8
Multiple Linear Regression T Test Results

Variabel	T	Sig.
Academic Self-Efficacy	13.089	.000
Teacher Sosial Support	6.269	.000

In Table 8, The T test is done by looking at the significance value of the analysis results. If the significance value is smaller than .05 (sig. <.05) then variable (X) has an influence on variable (Y). Based on table 8, the academic self-efficacy variable has a significance value of .000 (sig. <.05), so the first minor hypothesis is accepted, namely the academic self-efficacy variable has a positive influence on the academic flow variable. Furthermore, the teacher social support variable has a significance value of .000 (sig. <.05), so the second minor hypothesis is accepted, namely the teacher social support variable has a positive influence on the academic flow variable. The coefficient of determination test means the contribution of the influence given by the independent variable or independent variable (X) to the dependent variable or dependent variable (Y) which is useful for predicting how much contribution the X variables give together to variable Y. Table 9 shows the results of the coefficient of determination test.

Table 9
Test results of the Coefficient of Determination

R	R square (R^2)	Adjusted R square
.649	.421	.418

Based on Table 9, it is known that the coefficient of determination or R

square is 0.421. The R^2 value of .421 is obtained from the result of squaring the correlation coefficient or 'R', which is .649 × .649 = .421. This coefficient of determination shows that the academic self-efficacy variable (X1) and teacher social support (X2) together affect the academic flow variable (Y) by 42.1%. The rest, namely 57.9% (100% - 42.1%), is influenced by other variables outside this regression equation or variables not examined in this study. To find out the contribution of each variable effectively, it can be seen in Table 10.

Table 10
Effective Contribution of Independent Variables

Variable	Regression Coefficient (Beta)	Correlation Coefficient (r)	Effective Contribution (%)
Academic Self-Efficacy	.520	.605	31.5
Teacher Sosial Support	.249	.428	10.6

Table 10 shows the effective contribution of each independent variable to the dependent variable obtained from the multiplication of the regression coefficient with the correlation coefficient and then produced in percentage form. The academic self-efficacy variable has an effective contribution of .315 or 31.5% and the teacher social support variable has an effective contribution of .106 or 10.6%. The number of effective contributions of the two variables is the same as the number of values in the coefficient of determination or R square, namely .421 or 42.1%.

Discussion

The results showed that the majority of high school students in Jambi City had moderate levels of academic flow and academic self-efficacy that tended to be high in learning mathematics. Students feel comfortable and are able to concentrate highly, which is in line with the findings of Mayangsari et al. (2022) and Paryontri et al. (2021). They focus on academic tasks without being distracted, show high motivation, feel confident in their abilities, respond to positive feedback, and feel satisfaction when understanding new concepts (Amseke, 2024; Apriani & Nastiti, 2023; Mendoza et al., 2023). In addition, the majority of students have high academic self-efficacy, which helps them face learning challenges with confidence, supported by teacher guidance (Nugraha & Prabawati, 2019). The conducive atmosphere and social support from teachers not only increase comfort, but also motivate students to complete mathematics tasks with high dedication, as shown by the research of Baihaki et al. (2022).

The results of hypothesis testing showed a significant influence between academic self-efficacy and academic flow in learning mathematics among high

school students in Jambi City, so the first minor hypothesis was accepted. This shows that students' academic self-efficacy is an important predictor of the academic flow they feel. This finding is consistent with the research of Pantu (2021) and Nastiti et al. (2023), which stated that increasing academic self-efficacy increases the likelihood of experiencing academic flow in students. With high self-efficacy, students are able to maintain concentration and focus on academic tasks, despite facing difficulties. They tend not to give up easily, show high motivation, and are able to receive positive feedback to improve their performance, all of which are important for achieving academic flow (Alhadabi & Karpinski, 2020; Mao et al., 2020; Pramasari & Permitasari, 2022).

In addition, the results of hypothesis testing show that social support from teachers has a significant influence on academic flow in learning mathematics among high school students in Jambi City, so the second minor hypothesis is accepted. Social support from teachers helps students concentrate, feel comfortable, and intrinsically motivated, thus enabling them to achieve academic flow (Larasati & Nastiti, 2022; Novitasari et al., 2020). This support creates a supportive and safe learning environment, where students feel comfortable to take risks and ask questions when they need help. Positive social support from teachers also increases meaningful interactions between teachers and students, which in turn increases students' engagement and concentration during mathematics learning, helping them to achieve academic flow (Jia & Cheng, 2022; Ljubin-Golub et al., 2020; Zhang et al., 2023).

The results of hypothesis testing show that the major hypothesis of the study is accepted, so it can be concluded that academic self-efficacy and teacher social support jointly affect academic flow in learning mathematics among high school students in Jambi City. This suggests that students' beliefs in their abilities and the social support they receive from teachers are important predictors of academic flow experiences. Research by Yunalis and Latifa (2021) and Suryaratri et al. (2022) support this finding, showing that high self-efficacy and social support from teachers increase the likelihood of students experiencing academic flow. Social support from teachers provides additional comfort and motivation for students, helping them to overcome anxiety and increase confidence in learning mathematics, thus achieving an optimal learning experience (Jia & Cheng, 2022; Liu et al., 2023).

The implications of this study can provide knowledge about the importance of strengthening students' academic self-efficacy. Teachers need to optimize social support which can certainly help students build confidence in

their ability to learn and achieve academic success, and student comfort in the learning process has an important role in achieving academic flow. Students who are more confident in their abilities and supported in learning have a greater chance of achieving higher academic flow. Academic self-efficacy and social support, especially from teachers at school, are proven to help students to experience academic flow.

Conclusion

Based on the findings of this study on the influence of academic self-efficacy and teacher social support on students' academic flow in mathematics among senior high school students in Jambi City, it can be concluded that both variables significantly impact students' learning experiences. Higher levels of academic self-efficacy and stronger teacher social support serve as significant predictors of academic flow in mathematics learning, accounting for 42.1% of the variance.

The practical implication of these findings is that educators should foster students' confidence in their academic abilities and provide consistent, meaningful support to establish a positive and conducive learning environment. Such efforts are essential not only to enhance academic performance in mathematics but also to support students' psychological well-being and engagement.

For future research, it is recommended to broaden the scope by exploring additional variables that may influence academic flow in mathematics learning. Attention should also be given to potential mediating and moderating factors that could explain or strengthen the relationship between academic self-efficacy, teacher social support, and academic flow.

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