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# Influence of self-efficacy and peer social support on high school students' motivation to learn mathematics

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**ABSTRACT**

The purpose of this study is to examine the relationship between high school students' self-efficacy and peer support and their willingness to learn mathematics. One of the main issues facing the education sector is the motivation of high school students to comprehend mathematics. Students' willingness to learn mathematics is thought to be significantly impacted by peer social support. 66 high school students participated in the study, which used a quantitative sample technique. Structural equation modeling (SEM) with a non-specific bootstrapping approach was used to evaluate the data. The findings show that self-efficacy has a favorable and significant impact on motivation to learn mathematics ($\beta = 0.669$; $t = 4.522$; $p < 0.000$). Peer social support significantly and favorably affects kids' motivation to learn math. In summary, peer social support and self-efficacy have a notable and favorable effect on pupils' motivation to learn math. In conclusion, high school students' willingness to learn mathematics is significantly influenced by their peers' social support and their level of confidence. Students' motivation to learn mathematics can be raised by bolstering these two components.



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# INTRODUCTION

Math is one of the eye lesson base student for develop ability analytical, logical, and problemsolving problem. For produce source Power man quality high, education very much important. However, it is necessary underlined under that part big high school students think mathematics as eye less lessons liked and demanded, which can lower motivation they for learning. Motivation learning, which is defined as internal and external motivations that are owned student for change attitude study they are component important in success academic (Uno, 2016). This is especially applicable for mathematics, which requires perseverance and steadfastness heart.

One of problem main is lack of interest student school intermediate in Study mathematics. Problems This due to because various aspect Good That from in and also from outside. One of the

important internal components is *self-efficacy*. (Bandura, 1997) define trust self as belief somebody to his ability for make planning and doing necessary steps for reach something Goal. Students with level trust high self more tend motivated moment learn and more Ready face challenge in set more goals ambitious, especially in Study mathematics, which is often cause difficulty (Cleary & Zimmerman, 2004).

Element others, such as support social, also can play big role. System support the most significant social during adolescence, especially at school intermediate above, is Friend same age (Wentzel, 1998). Environment positive learning supported by support social from Friend peers, which includes contribution emotional, informative, helpful, and appreciative from friends. Supportive peers can help children feel good about self they alone, overcome pressure school, and participate in activity learning, such as mathematics (Nelson & DeBacker, 2008; Ryan & Patrick, 2001). Support social this no only contribute to welfare emotional students, but also can increase motivation academic they. When students feel accepted and supported by friends they, they tend more participate in activity learn and more open for face challenge academic (Wentzel, 1998). Research show that interaction positive with Friend same age can foster a sense of responsibility responsibility and collaboration, which is very important in context increasingly digital learning developing. With thus, creating supportive environment, good in a way emotional and also social can in a way significant influence success academic student.

Although study about influence *self-efficacy* and support social Friend same age to motivation Study has done in a way separate, research more carry on required for explore How second aspect This interact in influence will Indonesian high school students for Study mathematics. Understanding How support social Friend peers and trust self interact for push learning mathematics will give base strong scientific for development intervention more psychological and pedagogical effective in environment education. Therefore that, review desire high school students for study mathematics is one of objective study this.

# RESEARCH METHODOLOGY

Quantitative methods descriptive of the child used in research this. Research quantitative is techniques that use language and data with method and context certain for explore phenomenon. Because it has used in long time and considered as method study main, approach This known as approach conventional. Approach This has become crucial in unbiased data collection, evaluation, and findings throughout time (Lutfi, 2024).

Study This use approach connection correlation or causal for evaluate how far the fluctuations in one variable related with variation in variables others, with compare variable free with variable depends. Research This will use analysis track for analyze the influence of self-efficacy and support social Friend same age on will student for Study mathematics.

Samples are comprehensive population data that are used in research, which was collected through various processes for identify aspects certain from behavior individual, usually with choose sample or larger population wide (Swarjana, 2022). The calculation is as follows sample use Slovin's formula can seen based on picture under This:

If there are 193 students in population, size sample can counted use Slovin method for size minimum sample with a margin of error of 10% or 0.1.

$n = N / (1 + (N \times e^2))$

Then you can explain in formula following this:

$n = 193 / (1 + (193 \times 0.1^2))$

$n = 193 / (1 + (193 \times 0.01))$

$n = 193 / (1 + 1.93)$

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n = 193 / 2.93
n = 65.87 rounded up to 66 students

In the research This is the approach used is proportional random sampling. This random sampling fits where the population nature similar and structured tiered (Amruddin et al., 2022). SEM-PLS is form data analysis used in study this. Estimation method based on regression called SEM -PLS is used for determine properties statistics (Azwar, 2024).

The SEM-PLS method allows unauthorized use of data fulfil the assumption normal distribution and focuses on optimization variance explained by latent (Lutfi, 2024). The SEM model analyzes connection between latent variables with enter variable mediation. SmartPLS 4.1.0.8, which makes it easy processing direct Excel file, used for processing data (Setiabudhi, Suwono, Setiawan, & Karim, 2025).

Based on explanation in on so writer conclude lower hypothesis that will be investigated will using SEM – PLS analysis techniques track among them is:

$H_1$ : There is influence positive and significant Self-efficacy towards motivation Study mathematics high school students

$H_2$ : There is influence positive and significant support social Friend same age to motivation Study mathematics high school students.

So based on the above hypothesis, we can describe it in a framework think with objective for analyze the influence of self-efficacy on motivation Study mathematics high school students and influence support social friend same age to motivation Study mathematics high school students , the following picture framework think:

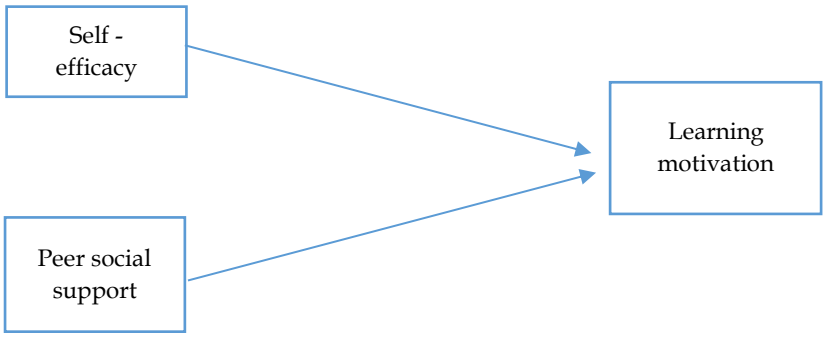


**Figure 1.** Framework

# RESULTS AND DISCUSSIONS

In this study, there were 66 high school students with characteristics Respondent different like type sex , with Student man consists of of 30 (50%) and women as much as 30 (50%). On the indicator variable *self efficacy,* support social Friend peers and motivation Study mathematics show that loading factor value > 0.7. The results are in accordance with (Hair, Hult, Ringle, & Sarstedt, 2017)who stated that when loading factor value > 0.7 then indicators used has fulfil valid criteria. In addition, the value *loading factor* between One variable indicator with variable latent must more tall compared to with other latent variables (Setiabudhi et al., 2025). The loading factor value can seen can picture under this:

**Table 1.**
Loading factor Validity values

| Variabel | Outer loadings |
|---|---|
| X1.1 <- X1. | 0,794 |
| X1.2 <- X1. | 0,657 |
| X1.3 <- X1. | 0,737 |
| X1.4 <- X1. | 0,768 |
| X2.1 <- X2. | 0,599 |
| X2.2 <- X2. | 0,757 |
| X2.3 <- X2. | 0,685 |
| X2.4 <- X2. | 0,777 |
| X2.5 <- X2. | 0,798 |
| Y1 <- Y | 0,754 |
| Y2 <- Y | 0,699 |
| Y3 <- Y | 0,777 |
| Y4 <- Y | 0,843 |
| Y5 <- Y | 0,803 |

Every variable in research This will do testing reliability besides testing validity. Reliability value composite and *Cronbach's alpha* for every variable analyzed for do testing this. Every variable must own significance more from 0.8 to reliability composite and more from 0.6 to *Cronbach's alpha* is considered *valid and reliable*. Validity strong convergence shown If mark *AVE* is at in range that can accepted, even though its value a little below typical threshold >0.5.

**Table 2.**
Summary of Composite reliability, Cronbach's alpha, and AVE using SmartPLS 4

| Variabel | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|---|---|---|---|---|
| X1. | 0,724 | 0,729 | 0,829 | 0,649 |
| X2. | 0,775 | 0,789 | 0,847 | 0,628 |
| Y | 0,834 | 0,838 | 0,883 | 0,603 |

Calculation *R-square* ($R^2$) and *R-square adjusted* ($R^2$ *adjusted*) show strong correlation between variable free and dependent in study this. Variables in the model explains 88.5% of the variation in motivation work ($R^2$ = 0.864, adjusted $R^2$ = 0.859). This is show that the model is built own potential very good predictive.

**Table 3.**
Value of R – square

| Variabel | R-Square | R-square adjusted |
|---|---|---|
| Y | 0,864 | 0,859 |

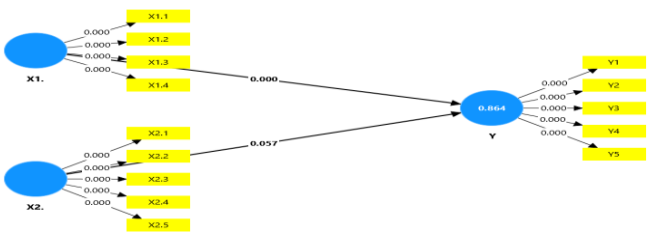


**Figure 2.** Output Bootstrapping Path Coefficients

Testing hypothesis can used a two-tailed test with level *margin of error* by 5 % with mark threshold that must be met fulfilled in testing hypothesis of 1.96. If the value *t count* more big from *t table*, so there is significant influence between variables. The values are can seen in the picture here is the hypothesis test under this:

**Table 4.**
Hypothesis Testing

| Variabel | Original Sample (O) | Sampel mean (M) | Standard deviation (STDEV) | T statistics (\|O/STDEV\|) | P values |
|---|---|---|---|---|---|
| X1. -> Y | 0,669 | 0,662 | 0,148 | 4,522 | 0,000 |
| X2.-> Y | 0,272 | 0,270 | 0,143 | 1,905 | 0,005 |

In general overall, results study show that self-efficacy is more factors dominant in influence motivation Study mathematics high school students compared with support social from Friend peers. For increase motivation Study mathematics, important for educators and parents for focus on development trust self student as well as create environment supportive social.

Research result This show that self-efficacy has influence significant positive to motivation Study mathematics high school students with t- statistic value of 4,522. Findings This indicates that student with level trust high self to ability academic they tend more motivated for involved active in learning mathematics. This result in line with study (Hasanah, Alizamar, Marjohan, & Engkizar, 2019) and (Shkëmbi & Treska, 2023)who found that self-efficacy has influence significant to motivation Study Vocational High School students in Padang. Consistency findings This show that self-efficacy is crucial internal factors in to form motivation Study students, no only at the level school intermediate vocational but also at school intermediate on.

Compliance results study this is also seen in research (Maghfirah, Wolor, & Sariwulan, 2022) (Novianti, Sadipun, & Balan, 2020), (Sulistiani, Fajrianthi, & Kristiana, 2022), (Basileo, Otto, Lyons, Vannini, & Toth, 2024)who confirmed that efficacy self in a way significant influence motivation Study students at State Vocational School 31 Jakarta. This is strengthen argument that self-efficacy is consistent predictor to motivation learning across different educational contexts. In addition, research (Aziz, Azizah, & Rifa'i, 2024)at level college height also shows that academic self-efficacy increase trust self students and contribute to the improvement motivation in finish thesis. Consistent pattern this show that self- efficacy has fundamental role in to form motivation Study from level school intermediate until college tall.

Implications theoretical from findings this refers to the Social Cognitive Theory developed by Bandura, where self-efficacy is seen as belief individual to his ability for organize and implement necessary actions for reach performance certain. In the context of learning mathematics, students with high self-efficacy tend set more goals challenge, show more persistence big when face difficulties, and use more learning strategies effective.

Study this also found that support friends same age own impact significant to motivation Study mathematics with t- t-statistic value of 1,905. Although its influence no as strong as self-efficacy, findings This show that environment positive social from Friend same age increase will student for study mathematics. This result support study previously conducted by Maghfirah et al. (2022 Consistency findings this is also visible in study (Tarigan, 2023),(Gerungan & Tondatuon, 2022)which shows that support social from Friend own impact significant positive to motivation Study students. Likewise with study Chen et (Chen, Bian, & Zhu, 2023)involving 2,106 students from various universities in China, where support social in a way significant predict involvement academic. Consistent pattern this show that support Friend same age is factor important external in to form motivation Study students in various level education.

Study Lin et (Lin, Hu, Chen, & Zhu, 2023)involving 1,320 students at universities tall vocational in China also confirmed that support social own influence positive significant to motivation learning. In addition, research (Abdullah & Al-Mofti, 2017), (Putri, Darmayanti, & Hasanuddin, 2023)on context learning Language English as Language foreigners in Iraqi Kurdistan show that support social from outside is one of the most influential factor to motivation learn. Even in context learning during COVID-19 pandemic, research (Camacho, Correia, Zaccoletti, & Daniel, 2021) (Xiangping Zhang, n.d.) show that support social from influential teachers positive to motivation

academic student. Findings this can explained through perspective theory social cognitive and theory motivation social, where environment social support can increase students' sense of belonging and competence. Support Friend same age in learning mathematics can in the form of help in understand concept, share solution strategies problem, giving encouragement emotional when face difficulties, and creating climate healthy competition.

Research result This give contribution important in the existing literature with highlight role double from self-efficacy and support Friend same age in increase motivation Study mathematics among high school students. Empirical evidence obtained can used for repair practice education that aims increase engagement and success student in mathematics. Findings This show that educator must focus on improving student self-efficacy through constructive activities trust yourself and create environment supportive social.

Implementation strategies that can be applied based on findings This covering learning collaborative, peer tutoring, and creating atmosphere positive class. Learning collaborative can facilitate support Friend same age while give chance for student for experience success in finish problem mathematics, which in turn will increase their self-efficacy. Peer tutoring program No only give help academic but also creates system support strong social among student.

Study This own a number of necessary limitations acknowledged. First, the size relative sample small namely 66 students can influence generalization findings. Second, research done in context education certain that may be No represent all high school environment. Third, reliance on reported data Alone can introduces response bias.

For study upcoming, it is recommended for explore effect term long from self-efficacy and support Friend same age to achievement and engagement student in mathematics. Longitudinal studies can give better understanding deep about How factors This develop along time and its impact to performance academic term length. In addition, future research can investigate effectiveness designed interventions special for increase second factor and its impact to population diverse students in various arrangement education.

In general, overall, research shows that self-efficacy is significantly increases the motivation of high school students to study mathematics. Meanwhile, supporting friends and peers also plays an important role in creating an environment conducive to learning. With the handle second element This in a way simultaneous, educators can increase the engagement and success of students in mathematics. Findings This is consistent with the body of research that has been done, and gives runway strong empirical foundation for the development of learning strategies in mathematics more effective.

# CONCLUSION

This study finds that both self-efficacy and support from Friends of the same age have a significant influence on the motivation of high school students to study mathematics. Specifically, self-efficacy showed a strong positive effect with a t-statistic of 4.522, indicating that students with higher self-confidence in their academic skills are more motivated. Additionally, peer support, with a t-statistic of 1.905, contributes to a positive social environment that enhances motivation. The findings suggest that educators should focus on enhancing student self-efficacy through engaging activities and cultivating supportive social environments. While the study's sample size of 66 students limits generalizability, it provides valuable insights for educational practices aimed at improving student engagement and success in mathematics. Future research should investigate the long-term effects of these factors on student achievement across diverse educational contexts.

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