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Gender Differences in Academic Performance: The Role of Self-Efficacy and Learning Motivation

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Abstrak

Kepercayaan diri merupakan salah satu faktor penting dalam keberhasilan seseorang. Tingginya motivasi belajar seseorang akan berbanding lurus dengan peningkatan hasil belajar. Selain itu ada asumsi yang menyatakan bahwa gender mempengaruhi motivasi belajar sesorang sehingga berpengaruh juga pada hasil belajarnya. Untuk itu perlu dilakukan penelitian mengenai gender dan kepercayaan diri mempengaruhi hasil belajar mahasiswa. Penelitian kuantitatif yang dilakukan pada salah satu Universitas Negeri di Sumatera Utara bertujuan untuk mengevaluasi dampak self-efficacy dan motivasi belajar terhadap Indeks Prestasi Kumulatif (IPK) dengan mempertimbangkan perbedaan jenis kelamin. Sampel acak sederhana sebanyak 166 mahasiswa dipilih untuk desain korelasional. Data yang dikumpulkan melalui kuesioner dianalisis menggunakan regresi berganda. Hasil penelitian menunjukkan bahwa self-efficacy dan motivasi belajar tidak berpengaruh signifikan terhadap IPK berdasarkan jenis kelamin. Hal ini ditunjukkan dengan nilai F hitung yang tidak signifikan. Koefisien korelasi sebesar 0,086 dan koefisien determinasi sebesar 0,007 menunjukkan kecilnya pengaruh variabel-variabel tersebut terhadap varians IPK. Penelitian berikutnya harus mengeksplorasi faktor-faktor lain yang berkontribusi terhadap hasil IPK untuk pemahaman yang lebih komprehensif tentang pengaruhnya terhadap prestasi akademik.
Kata Kunci: IPK; Jenis Kelamin; Motivasi Belajar; Self-Efficacy.

Abstract

Self-efficacy is one of the important factors in one's success. The high motivation of a person to learn will be directly proportional to the increase in learning outcomes. In addition, there is an assumption that gender affects a person's learning motivation so that it also affects their learning outcomes. For this reason, it is necessary to conduct research on gender and self-efficacy affecting student learning outcomes. This quantitative study, conducted at one of the State Universities in North Sumatra aim to evaluate the impact of self-efficacy and learning motivation on Grade Point Average (GPA), considering gender differences. A simple random sample of 166 students was selected for a correlational design. Data collected through questionnaires were analyzed using multiple regression. Results indicated that neither self-efficacy nor learning motivation significantly influenced GPA based on gender, as indicated by an insignificant F-calculated value. The correlation coefficient was 0.086, and the coefficient of determination was 0.007, indicating a minimal influence of these variables on the variance of GPA. Future research should explore other factors contributing to GPA outcomes for a more comprehensive understanding of the influences on academic achievement.
Keywords: IPK; Gender; Learning Motivation; Self-Efficacy.

I. INTRODUCTION

The Fourth Industrial Revolution, characterized by rapid technological advancements, has profoundly transformed various sectors, including education (Rafiola et al., 2020; Shenkoya & Kim, 2023) . Given the global recognition of education's pivotal role in individual and societal development (Honicke et al., 2020; Zukan & Aldulaimi, 2020), understanding factors influencing academic performance is imperative. Research has consistently identified self-efficacy and motivation as key determinants of student success (Khan, 2013; Prajono, Gunarti, & Anggo, 2022; Ariany). In light of contemporary technological advancements, the relationship between these variables and academic achievement has become increasingly salient (Yu & Deng, 2022; Rosjanuardi, & Juandi, 2023). These variables refers to gender differences in e-learners' self-efficacy, satisfaction, motivation, attitude, and performance (Mutiarani & Sofyan, 2022; Pebrianti & Puspitasari, 2023; Elmawati et al., 2024). This study delves into these factors, examining their impact on students' gender-based GPA.

Self-efficacy, according to Bandura defined as an individual's belief in their ability to achieve specific goals (Schunk & DiBenedetto, 2021; Nofriyandi et al., 2024), is a recognized factor influencing academic achievement (Ibrahim & Wah, 2020). Learners with high self-efficacy demonstrate greater effort, resilience in the face of challenges, and ultimately, improved academic performance (Wiharso Susilawati, 2020; Hanham et al., 2021). Conversely, low self-efficacy can hinder academic success (Yüner, 2020; Hendrawan & Hendriana, 2021).

Motivation, another crucial factor in academic achievement (Yulianto, Yulianto, & Hidayanto; 2022; Wang & Yu, 2023), encompasses the internal drive to pursue goals and learn effectively (Moghadari-Koosha et al., 2020). It can be categorized as either intrinsic (driven by inherent satisfaction) or extrinsic (motivated by external rewards) (Yenni & Sukmawati, 2020; Ommering et al., 2021). Intrinsic motivation is associated with the enjoyment of learning itself, while extrinsic motivation focuses on achieving specific outcomes (Nofriyandi, Abdurrahman, Andrian, 2023; Wang & Yu, 2023; Munaji et al., 2024; Darojat, 2024).

Gender may also play a role in academic performance (Tamba & Bermuli, 2023). While some argue for minimal gender differences, others suggest environmental factors influencing these differences. For instance, a study on accounting students found that 67.27% of the differences in male and female academic performance are attributed to observable characteristics, with scholarships positively influencing the academic performance of only female students (Li & Singh, 2021; Martí-Ballester, 2019). Additionally, research on STEM subjects at the University of Ghana revealed gender differences in academic performance under various conditions (Wrigley-Asante et al., 2023). Furthermore, a study on personality traits found that different traits impact the academic performance of students for both boys and girls, with extraversion, conscientiousness, agreeableness, and emotional stability

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influencing male students, while openness influenced female students. Lastly, a quasi-experimental design study on test pressure showed that male students outperform their female counterparts under high pressure, but the gender gap narrows and even reverses in favor of female students under low test pressure (Montolio & Taberner, 2021).

Studies indicate that girls may be subject to lower expectations and less encouragement than boys impacting their self-efficacy and motivation (Li & Singh, 2021). Conversely, research by Aivaloglou & Hermans (2019) suggests female students may be more adept at adjusting their self-efficacy beliefs in response to performance feedback. However, this can lead to disengagement if they internalize early failure.

Building upon these findings, this study aims to systematically examine the influence of self-efficacy and learning motivation on students' GPA, considering potential gender differences. By exploring these relationships, we can gain valuable insights into how these factors contribute to academic success and inform strategies to support students from all genders.

II. METHOD

This study employs a correlational research design to investigate the relationship between self-efficacy, motivation, and academic performance among mathematics education students at one of the State Universities in North Sumatra. A quantitative approach was adopted to analyze the data collected from a sample of 166 consist of 33 male students and 133 female students of the mathematics education study program in the fifth semester. The research time was conducted in July 2023 students selected using simple random sampling. A questionnaire was administered to measure the participants' self-efficacy and motivation levels. Data analysis involved descriptive statistics to summarize the data and multiple regression analysis to examine the predictive relationship between the variables.

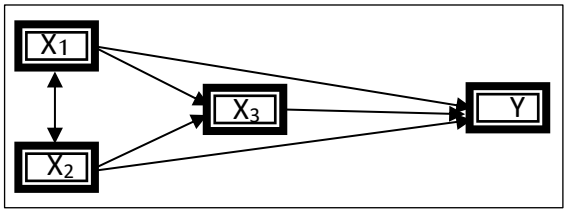

Figure 1. Design of this Study

III. RESULT AND DISCUSSION

Descriptive analysis was conducted using mean, standard deviation (SD), and number of observations (N) for the variables of self-efficacy, learning motivation, and GPA. The descriptive statistics are presented in Table 1.

Table 1.
Descriptive statistics

	Self-Efficacy	Learning Motivation	GPA
N	166	166	166
Mean	50,90	70,82	3,49
Median	50,00	71,00	3,52
Std. Deviation	6,37	7,27	0,21
Variance	40,63	52,90	0,04
Minimum	37	49	2,91
Maximum	80	99	3,94

The descriptive statistics indicate that students have a moderate level of self-efficacy (mean = 50,90), learning motivation (mean = 70,82), and GPA (mean

= 3,49). The variability shown by the standard deviations suggests a reasonable spread of scores around the mean, indicating diversity in student experiences and performance levels. These findings are consistent with previous studies that highlight the central role of self-efficacy and motivation in academic achievement (McLeod, 2016; Ryan & Deci, 2000).

Most students fall within the medium self-efficacy category (76,51%). This suggests that most students have a moderate belief in their ability to succeed academically. High self-efficacy has been linked to better academic performance and persistence (Honicke & Broadbent, 2016). The self-efficacy categories presented in Table 2.

Tabel 1.
Self-efficacy categories

Category	Range	N	%
Low	X≤ 44,50	23	13,86
Medium	44,50 < X ≤ 57,3	127	76,51
High	X < 57,300	16	9,64

For the learning motivation variable, Medan State University students tend to be Most students have medium learning motivation (77,71%), indicating a generally positive but not exceptional level of motivation towards learning. Learning motivation is crucial for student engagement and academic success (Ryan & Deci, 2020). The learning motivation categories presented in Table 3.

Tabel 2.
Learning motivation categories

Category	Range	N	%
Low	X ≤ 63,50	22	13,25
Medium	63,50 < X ≤ 78,10	129	77,71
High	X < 78,10	15	9,04

Based on the results, the respondents in this study totaled 166 students, consisting of 133 people with female gender and 33 people with male gender. There is a significant gender disparity, with a higher proportion of female students (80,12%). This demographic imbalance could influence the generalizability of the findings and should be considered when interpreting the results (Sax, 2008).The result can be seen in Table 4.

Tabel 3.
Gender description

Gender	Total	%
Male	33	80,12
Female	133	19,88
Total	166	100

Based on the research data obtained, the GPA of Medan State University students tends to be in the medium category. Many students have medium GPA scores (69,28%), suggesting average academic performance across the sample. This aligns with the notion that various internal and external factors influence academic outcomes is well-documented, with significant research indicating the impact of family background, socio-economic status, and educational resources (Garcia & Weiss, 2017; Voyer & Voyer, 2014). The complete data can be seen in Table 5.

Tabel 4.
GPA categories

Category	Range	N	%
Low	X ≤ 3,29	25	15,06
Medium	3,29 < X ≤ 3,70	115	69,28
High	X < 3,70	26	15,66

A. Impact of Self-Efficacy, Learning Motivation, and Gender on GPA

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The ANOVA results in Table 6 indicate that self-efficacy, learning motivation, and gender do not significantly influence GPA (F = 0,40; p = 0,75).

Tabel 6.
ANOVA[a] regression model 1

Model 1	Sum of Square	Df	Mean Square	F	Sig.
Regression	0,05	3	0,02	0,40	0,75[b]
Residual	7,14	162	0,04		
Total	7,19	165			

[a.]Dependent Variable: GPA

[b.]Predictors: (Constant), Gender, Learning Motivation, Self-Efficacy

The results suggest that the combined effect of self-efficacy, learning motivation, and gender on GPA is not statistically significant. This implies that these variables do not collectively explain the variations in students' academic performance. Other factors, possibly environmental or personal, might have a more substantial impact on GPA .

Tabel 7.
Model summary regression ANOVA[a]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0,086[a]	0,007	-0,011	0,210	0,007	0,402	3	162	0,752

[a.]Predictors: (Constant), Gender, Learning Motivation, Self-Efficacy
[b.]Dependent Variable: GPA

Table 7 indicates that self-efficacy, learning motivation, and gender are not strong predictors of GPA. This low R^2 value suggests limited practical application of these variables in explaining academic performance (Richardson et al., 2012).
Furthermore, partial testing is carried out between self-efficacy, motivation, and gender variables on student GPA which can be seen by paying attention to the coefficients table. Table 8 presents the coefficients for the regression model. None of the variables—self-efficacy (β = 0,002, t = 0,73, p = 0,47), learning motivation (β = -0,003, t = -1,032, p = 0,304), and gender (β = -0,008, t = -0,23, p = 0,840)—significantly predict GPA.

Tabel 8.
Coefficients regressiona model 1

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
	B	Std. Error	Beta			Zero-order	Partial
Constant	3,588	0,191		18,825	0,000		
Self-Efficacy	0,002	0,003	0,063	0,731	0,466	0,026	0,057
Learning Motivation	-0,003	0,002	-0,089	-1,032	0,304	-0,063	-0,081
Gender	-0,008	0,041	-0,016	-0,203	0,840	-0,013	-0,016

[a.]Dependent Variable: GPA

Furthermore, hypothesis testing will be carried out to see the effect of self-efficacy (X_1) and learning motivation (X_2) on gender (X_3) using multiple regression analysis which can be seen based on in Table 9.

Tabel 9.
ANOVA[a] regression model 2

Model 2	Sum of Square	Df	Mean Square	F	Sig.
Regression	0,043	3	0,022	0,134	0,875[b]
Residual	26,396	162	0,162		
Total	26,440	165			

[a.]Dependent Variable: GPA
[b.]Predictors: (Constant) Learning Motivation, Self-Efficacy

Based on the ANOVA in Table 9, the F_{count} value is 0.134 with a sig value. 0,875 > 0,05. Because sig. 0,875 > 0,05 then H0 is accepted and Ha is rejected in the sense that self-efficacy and learning motivation do not have a significant influence on gender. Furthermore, it can be seen in the Model Summary table that the R value is 0,041 and R^2 is 0,002, which means that the self-efficacy and learning motivation variables are only able to explain the gender variable by 0,2%, the rest is explained by other factors that can be seeen in Table 10.

Tabel 10.
Model summary regression ANOVA[a]

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0,041[a]	0,002	-0,011	0,402	0,002	0,134	2	163	0,875

[a.]Predictors: (Constant), Learning Motivation, Self-Efficacy
[b.]Dependent Variable: Gender

Furthermore, to determine the partial effect between the self-efficacy variable (X_1) and learning motivation (X_2) on gender (X_3) can be seen based on the Coefficients table that can be seen in Table 11.

Tabel 11.
Model summary regression ANOVA[a]

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations	
	B	Std. Error	Beta			Zero-order	Partial
Constant	1,821	0,336		5,416	0,000		
Self-Efficacy	0,002	0,005	0,038	0,445	0,657	0,023	0,035
Learning Motivation	-0,002	0,005	-0,036	-0,423	0,673	-0,021	-0,033

[a.]Dependent Variable: Gender

For the self-efficacy variable, the beta value is 0,002, with a t_{count} of 0,445 and a significance value of 0,657, which is greater than 0,05. Thus, H_0 is accepted, indicating no significant effect of self-efficacy on gender.

For the learning motivation variable, the beta value is -0,002, with a t_{count} of -0,423 and a significance value of 0,673, which is also greater than 0,05. Therefore, H_0 is accepted, indicating no significant effect of learning motivation on gender.

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The regression equation derived from this multiple regression analysis is: $Y = 1{,}821 + 0{,}002X_1 - 0{,}002X_2$

In this study, the focus of discussion is on self-efficacy and motivation and gender, three variables that can affect students' academic performance during lectures. The research questions focus on whether self-efficacy affects students' GPA; whether motivation affects students' GPA; whether gender affects students' GPA. This study also examines how students' gender influences their GPA and the relationship between their self-efficacy and learning motivation. According to the study's findings, self-efficacy did not significantly affect students' performance in school, which addressed the research question. Accordin to (Moghadari-Koosha et al., 2020) which states that there is no relationship between self-efficiacy and academic achievement. However, in Khan (2023) claimed that there is a favorable relationship between GPA and self-efficacy. Self-efficacy students will be more "optimistic" and put forth more effort to finish their schoolwork, affecting their GPA at the end of the learning process. When someone feels they cannot handle a particular task or activity, they will soon move on to something else and will not want to put in the effort necessary to finish it. One personal characteristic that acts as a bridge or mediator in the relationship between environmental and behavioral factors is self-efficacy (Rafiola et al., 2020) Self-efficacy affects how people learn and make decisions and helps predict how well people will perform when faced with challenges (Kasturi et al., 2021). Self-efficacy emphasizes individual characteristics, such as students' self-perception of their limitations and level of confidence.

This study found a significance value of motivation of 0,30> 0,05. This contradicts the results of other studies which state that motivation is a very strong predictor of GPA (Abu Bakar et al., 2022; Almalki, 2019). Students who are in the background in particular conditions and situations and who behave to achieve goals are said to have a variety of actions and behaviors that are motivated by factors (Rafiola et al., 2020). Zukan & Hameed Aldulaimi (2020) stated that basically learners with higher GPAs are considered more motivated to succeed. However, Rajapakshe (2021) rejected this research in line with these findings he stated that motivation has no effect on academic achievement. Not all self-motivation is effective, and it may also depend on how confident a person is in their learning ability (Honicke et al., 2020).

Judging by gender in this study, gender does not have a positive and significant influence on student GPA, seen based on the results of t_{count} -0,23 and the value of Sig. 0,84 > 0,05. This is in opposition to other studies that claim gender impacts academic achievement and that female students' more substantial academic outcomes might be attributed to their more excellent work ethic (Olowookere et al., 2020). Kasturi et al. (2021) according to their study, there was no discernible difference in self-efficacy between men and women; both sexes scored highly in this category. According to his research, there is no difference in the worth of

mathematical self-efficacy between men and women, even though males have higher levels of it. This study found that there was no positive and significant effect of self-efficacy and motivation on GPA viewed through gender. This is obtained based on the valu F_{count} of 0,40 when compared to F_{table} which is 2,66 then F_{count} (0,40) < F_{table} (2,66) or it can also be seen from the value $sig.$ namely 0,75 > 0,05. This research is in line with Rafiola et al. (2020) and Rajapakshe (2021) findings that self-efficacy and motivation have no beneficial effects on academic performance. The study's conclusions show that in addition to personality traits like motivation and self- efficacy, learning ability, pedagogy, and family or other social concerns all affect GPA.

Based on the correlation coefficient (R) obtained in this study of 0,086, it means that the level of relationship is very low. Then the coefficient of determination (R square) is 0,007 or 0,7%. This means that 0,7% of the GPA variable can be explained by self-efficacy, motivation and gender. While the remaining 99,3% is explained by other variables outside the research model. However (Chang & Tsai, 2022) stated that learning motivation and self-efficacy play a key role in academic achievement. In research conducted by Aivaloglou & Hermans (2019) found that self-efficacy correlates with motivation and has a gender dependent feedback relationship with students' learning performance. Theory and self-efficacy research conducted by Schunk & DiBenedetto (2021) have significantly advanced our knowledge of and comprehension of human motivation. The researchers highlight the importance of self-efficacy as a fundamental internal motivational process that is influenced by both environmental and individual factors. Self-efficacy can also have an impact on motivational outcomes such as effort, persistence, and achievement. The researcher added that we could anticipate that technology that monitors students' academic achievement will also have a favorable effect on students' motivation and sense of self-efficacy.

Contrary to our hypotheses, the findings of this study did not support a significant relationship between self-efficacy, learning motivation, and academic performance. The research showed that the linkage between trait emotional intelligence and academic self-efficacy was not significant in any of the two groups which implies that some other variables such as perceived family support and environmental hazards are also vitally important for academic performance link . This bears out the fact that academic achievement is multifaceted since emotional intelligence alone or self-efficacy without the help of a supportive environment and family will hardly cause success (Budiongan et al., 2024; Tebbouche, 2023; Zhang et al., 2023). Gaining an insight into these phenomena can help the educators and policymakers formulate a better understanding of the support structures that need to be provided which take into account emotional skills development and other aspects which may affect student performance. This means that schools may transform the learning environment for students by focusing on emotional skills training while involving families and

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improving the environment. All of these can be done so that students perform well in class. This means that emotional skills training for students should be coupled with provision of necessary materials and support for the students to excel in their studies. These results suggest that other factors, such as socioeconomic status, learning environment, and personal characteristics, may play a more influential role in determining academic success.

IV. Conclusion

The present study aimed, in short, to examine the influences of self-efficacy and motivational orientations toward GPA, while also considering gender differences. The empirical results of this study indicated that there was, in fact, no significant influence between self-efficacy, learning motivation, and gender on GPA. The results of the current study, therefore, might not support the initial hypothesis; yet, it would guide us toward a better understanding of more complex determinants that influence the attainment of good grades.

This study is able to present the provision that actual self-efficacy and learning motivation, two presumed primarily responsible factors, did not have a marked effect in the situation examined, thereby opening further horizons for an in-depth search for some other more pertinent factors. The findings from this study will benefit educational practitioners in the development and implementation of intervention programs aimed at raising the levels of students' achievements.

This study has to be considered within the limitations. First, the cross-sectional nature of this study makes it impossible for us to ascertain a cause-effect relationship. The study involved only students from one university; therefore, the findings may not be generalizable. Future research may replicate these findings with a different sample pool and study the other factors that influence academic achievement, including but not limited to personality, study habits, and peer influence, among others, in a longitudinal design that permits the expansion of more detailed conclusions regarding changes of self-efficacy, motivation, and academic performance over time.

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