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Academic Self-Efficacy as A Mediator on The Relationship Between Academic Motivation and Academic Achievement of College Students During the Online Learning Period

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ABSTRACT

There are limitations to the review of the role of academic self-efficacy as a mediator of the link between academic motivation and academic achievement in students. This study aims to determine the direct, indirect, and total effects of academic self-efficacy as a mediating relationship between academic motivation and achievement. This study used 127 college students and health workers as samples. The profile of academic motivation was measured using the academic motivation scale, and academic self-efficacy was measured using the learning self-efficacy scale. The analysis technique in this study used the Robust Bootstrap Test for Mediation Analysis. This study explained that academic self-efficacy empirically played a role in mediating the relationship between academic motivation and academic achievement ($\beta = .26$; $p < .001$; CI: [0.198-0.330]).

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INTRODUCTION

The Coronavirus-19 outbreak in Wuhan has spread rapidly, with cases being confirmed in many countries (Tan, 2021). The impact of Coronavirus-19 is far-reaching, not only on the global economy but also on the educational process. The Indonesian government's policy was to implement distance learning to avoid the spread of COVID-19 in schools or colleges. This policy was issued through a circular letter dated March 17, 2020, regarding distance learning to prevent the spread of COVID-19. Distance learning can be defined as learning that is carried out without face-to-face contact in the classroom between students and lecturers (Azhari & Fajri, 2021). Therefore, distance learning is a solution for learning during the COVID-19 pandemic.

Not only in Indonesia, but almost all universities or colleges worldwide suddenly transitioned from face-to-face to remote learning (Aristovnik et al., 2020; Coyne et al., 2020; Hayat et al., 2020). Furthermore, several studies have reported that distance learning has resulted in low academic achievement and academic motivation in students (Tan, 2021). Silabian et al. (2021) examined the differences in academic achievement before and after distance learning in 219 students, finding decreased student academic achievement during distance learning. Similarly, Whitley et al. (2021) found decreased academic achievement during distance learning. Other studies, such as Vargas-Ramos et al. (2022) of 341 students, found decreased academic achievement during distance learning. In addition to decreased academic achievement during distance learning, low academic motivation is also one of the negative impacts of distance learning during the COVID-19 pandemic. Academic motivation is an important psychological aspect in determining student behavior's direction, intensity, and determination in the learning process (Alderman, 2004). Tan (2021), in a study involving 282 students, found a decrease in student academic motivation during distance learning.

Low academic motivation during distance learning among students was also found in the research of Klootwijk et al. (2021). Meeter et al. (2020), in a study involving 15,125 students, showed that students rated distance learning as less satisfactory than face-to-face learning, and students assessed that academic motivation decreased during distance learning. The negative impact of distance learning has been identified by the authors of five students from one of the Schools of Health Sciences in Padang who received a D grade in Clinical Management II during distance learning. Based on the initial measurement of the level of academic motivation using the Academic Motivation Scale, Short Indonesian Language Version, developed by Natalya (2018), the five students had a low level of academic motivation.

According to Ryan and Deci (2020), low academic motivation is a lack of intentionality. Other experts also explained that low academic motivation is a psychological condition with reduced initiation and resistance to achieving

something (Shen et al., 2010). Low academic motivation is a common problem in the university environment, caused by a lack of self-confidence (self-efficacy), incompetence, or a lack of value or interest (Ryan & Deci, 2020). In previous research, low academic motivation could affect student academic achievement (Ananda et al., 2018; Hasibuan, 2019; Puspitha et al., 2018).

Hence, students with low academic motivation lack the intentionality and resistance to complete the learning process. This issue ultimately causes students to not have a strategy and effort for learning, which can affect academic achievement. Kusurkar et al. (2013) explained that low academic motivation had a negative correlation with learning strategies ($r = - 0.313$; $p < .01$), learning effort ($r = - 0.08$; $p < .01$), and academic achievement ($r = - 0.097$). Thus, with academic motivation, students will have learning strategies and learning efforts, ultimately impacting better academic achievement. Wu et al. (2020) found that academic motivation had a relationship with academic achievement ($r = .11$; $p < .01$).

During the COVID-19 pandemic, low academic motivation and academic achievement were triggered by various problems, including learning overload and a lack of distance learning experience, and exacerbated by unconducive home conditions, including loss of access to academic resources (for example, computers and internet connectivity) and disruption of the learning environment at home (Al-Kumaim et al., 2021; Clabaugh et al., 2021). Distance learning requires students to participate more actively during learning, look for effective learning strategies, and make greater learning efforts to gain new knowledge and information when interacting with lecturers and other students (Gustiani, 2020). Extra efforts during the distance learning process are largely determined by students self-efficacy in their competence when studying and overcoming existing problems, and this will ultimately determine whether students will be motivated to learn or become unmotivated.

Al-Kumaim et al. (2021) revealed that to overcome the problems of distance learning, students need to have high self-efficacy during the distance learning process. Based on the findings, 74.2% of students motivated to learn had high academic self-efficacy, while 27.4% of students with low academic self-efficacy were not motivated to learn. Self-efficacy is the main component and refers to students' assessments of their ability to regulate and carry out the actions or behaviors needed to achieve the desired performance (Honicke & Broadbent, 2016). In an educational setting, self-efficacy is often described by the term Academic Self-Efficacy (ASE), which defines students' evaluation of their capability to achieve academic achievement (Elias & MacDonald, 2007).

Academic self-efficacy is a self-influence factor that motivates and regulates behavior (Honicke & Broadbent, 2016). Low academic self-efficacy will make students unmotivated during learning (Ryan & Deci, 2020). However, having high academic self-efficacy toward their competencies will increase student motivation in the learning process (Alderman, 2004; Bandura, 1997; Cook & Artino, 2016; Hayat et al., 2020; Salleh et al., 2021). Valentine et al. (2004), in a

study with a meta-analysis design, found that academic self-efficacy positively correlates with academic motivation. Zajacova et al. (2005) found that academic self-efficacy could predict academic motivation. In addition to academic self-efficacy related to academic motivation, academic self-efficacy is considered important in influencing academic achievement. Academic self-efficacy has consistently been positively correlated with academic performance, with meta-analytic studies reporting moderate effect size levels (Richardson et al., 2012).

Previous research has also reported that self-efficacy is strongly associated with academic achievement (Honicke & Broadbent, 2016; Richardson et al., 2012). The results consistently reveal that higher academic self-efficacy scores result in higher academic achievement (Yokoyama, 2019). High academic self-efficacy makes students confident in their competence in completing the academic process well, making them committed, trying, and diligent during the learning process (Hayat et al., 2020). On the other hand, students who have low academic self-efficacy tend to be uncommitted, make no effort, and are not diligent during the learning process (Hayat et al., 2020).

For students to achieve good academic achievement, marked by a good grade point average (IP), it takes the influencing factors described previously, namely academic self-efficacy and motivational factors (Richardson et al., 2012). Given that academic self-efficacy is considered a self-influence factor that motivates a person to behave and regulate behavior in the context of learning to achieve good academic achievement and that motivation also influences academic achievement, it is unsurprising that academic self-efficacy has been used as a variable that mediates the relationship between the independent and dependent variables in many studies, especially in the context of educational psychology.

Various studies have examined the mediating role of academic self-efficacy. Self-efficacy in an academic or educational context is also considered to play a role as a mediator in various variables, such as perceived education quality on career choices (Kahraman & Demirdelen Alrawadieh, 2021), academic motivation on academic burnout (Pourkarimi & Mobinrahni, 2018), academic motivation on class activities (Gao et al., 2011), parental involvement and academic ability (Hussain et al., 2020), and academic motivation on academic ability (Seo, 2008).

METHODS

Quantitative research type Path analysis is the type of research used in this study. Path analysis examines possible causal relationships between three or more variables (Fraenkel et al., 2011). The population in this study were students of the health study program at a health science high school in Padang, West Sumatra. The total population in this study was 188 students. The characteristics of the subjects in this population include men and women aged 18–35 years, active student status in semesters II, IV, and VI, speech therapy study programs, midwifery, and nursing.

To determine the sample size, the author used the Slovin formula. Referring to the Slovin formula calculated online using the www.calculator.net site, the sample size needed was 127 subjects, with a 95% confidence interval. One hundred and eighty-eight subjects were coded. Then, to select 127 subjects from 188, the sample selection technique used was simple random sampling. One hundred and twenty-seven subjects were selected online using the website www.digitalfirst.bfwpub.com.

The data collection instruments in this study consisted of three instruments: modifications to the academic motivation scale, modifications to the learning self-efficacy scale, and course scores to measure academic achievement. The selection and modification of the academic motivation and learning self-efficacy scales were carried out based on the similarity of the theoretical basis used.

Academic Motivation Scale

Academic motivation is measured using the academic motivation scale developed by Natalya (2018). The Academic motivation scale measures three types of motivation: intrinsic, extrinsic, and motivational (Table 1). The total items on the academic motivation scale consist of 15 favorable items on a Likert scale (1 for strongly disagreeing to 5 for strongly agreeing). The academic motivation scale in its development has a discrimination index that moves from 0.366 to 0.682, with a reliability level of 0.706 to 0.865 (Natalya, 2018). In the same study, the 15 items on this scale were perfectly grouped according to their respective sub-dimensions using Exploratory Factor Analysis (Natalya, 2018).

Table 1. Blueprint academic motivation scale

Aspect	Item		Total
	Favorable	Unfavorable	
Intrinsic Motivation to Know (IMTK)	1,2	-	2
Intrinsic Motivation to Accomplish Things (IMTA)	3,4,5	-	3
Intrinsic Motivation to Experience Stimulation (IMES)	6,7	-	2
External Regulation (EMER)	8,9,10	-	3
Introjected Regulation (EMIN)	11,12	-	2
Identified Regulation (EMID)	13	-	1
Motivation	14,15	-	2
Total item	15	0	15

Learning Self-Efficacy

Student academic self-efficacy in this study was measured using a modified learning self-efficacy scale (L-SES). The selection of the L-SES instrument in this study was based on the similarity of the construct theory that underlies the scale, called Bandura's theory (Kang et al., 2019). L-SES is a scale used to identify students' self-efficacy in health study programs in an academic context, developed by Kang et al. (2019).

Items on this scale consist of 12 items, with a 5-point Likert scale used (1 for strongly disagreeing to 5 for strongly agreeing). This scale consists of three domains: cognition, affect, and psychomotor. The original version of the learning

self-efficacy scale has reliable validity and reliability. Based on the research, this scale has a discrimination index of 0.768 with reliability.

Academic Achievement

This study's academic achievement ability was measured using four courses containing clinical practice credit elements. The value in each course was converted from letters to numbers, which consists of five levels: A (score 5), B (score 4), C (score 3), D (score 2), and E (score 1).

Data Analysis and Software

The data analysis technique used in this research was the Robust Bootstrap Test for Mediation Analysis using JASP. The Robust Bootstrap Test method has shown that it is superior in estimating effect sizes and more reliable in assessing its significance than existing methods (Alfons et al., 2021).

RESULT AND DISCUSSION

One hundred and twenty-seven subjects in this study could be differentiated based on gender, age, and semester level. Based on gender, men in this study consisted of 13 subjects (10.2%), and women consisted of 114 subjects (89.7%) (Table 2). Based on existing data, the age range of the 127 subjects in this study ranged from 18 years to 35 years (Table 3). Subjects aged 21 years were the most (33.8%), while subjects aged 23 and 35 were the fewest (0.7%). Based on semester level, semester II consisted of 64 subjects (50.3%), semester IV consisted of 21 subjects (16.5%), and semester VI consisted of 42 subjects (33.0%) (Table 4). The average total score on academic motivation was 67,701 (SD = 3,426), the average total score on academic self-efficacy was 53,583 (SD = 4,466), and the average total score on academic achievement was 16,724 (SD = 2,034). Table 5 shows the results of the descriptive statistical analysis.

Table 2. Subjects by gender

Gender	Frequency	%
Male	13	10.2
Female	114	89.7
Total	127	100

Table 3. Subjects by age

Age	Total	%
18	2	1.5
19	35	27.5
20	34	26.7
21	43	33.8
22	11	8.6
23	1	0.7
35	1	0.7

Table 4. Subjects by semester level

Semester	Total	%
II	64	50.3
IV	21	16.5
VI	42	33

Table 5. The mean and standard deviation of each variable

Variable	Mean	SD
Academic motivation	67.701	3.426
Academic self-efficacy	53.583	4.466
Academic achievement	16.724	2.034

The relationship between academic motivation, academic self-efficacy, and academic achievement

Based on correlation analysis using Spearman's correlation approach, there is a relationship between academic motivation (MA) and academic self-efficacy (EDA) ($r = .71$; $p < .001$), academic motivation (MA) and academic achievement (PA) ($r = .70$; $p < .001$), and academic self-efficacy (EDA) with academic achievement ($r = .78$; $p < .001$) (Table 6).

Multiple regression analysis shows that academic motivation and self-efficacy significantly and equally influence academic achievement ($R2 = .78$; $p < .001$). That is, 78% of high or low student academic achievement can be explained by high or low academic motivation and academic self-efficacy. Meanwhile, the rest is explained by psychological constructs or other factors besides academic motivation and self-efficacy.

Table 6. Correlation analysis

Variable	1	2	3
1. Academic self-efficacy	-	-	-
2. Academic motivation	.712*	-	
3. Academic achievement	.789*	.705*	-

**P < 0.001*

Table 7. Multiple regression analysis

R	R2	Adjusted R^2	RMSE
0.000	0.000	0.000	2.034
0.887	0.787	0.787	0.946

Mediation Effect

Based on the mediation analysis using the Robust Bootstrap Test using JASP, parameter estimates and significance values for direct, indirect, and total effects were obtained. The direct effect results from the independent variable (academic motivation) on the dependent variable (academic achievement). Based on direct

effect, academic motivation has a significant direct effect on academic achievement (β = .19; p < .001; CI: [0.123–0.257]) (Table 8).

The indirect effect results from the independent variable (academic motivation) on the dependent variable (academic achievement) through a mediator variable (academic self-efficacy). Based on the indirect effect, there is an influence of academic motivation (MA) on academic achievement (PA), which is mediated by academic self-efficacy (EDA) (β = .26; p <.001; CI: [0.198-0.330]). Based on the indirect effect analysis results, academic self-efficacy significantly mediates the relationship between academic motivation and achievement.

The total effect is the effect of the independent variables (academic motivation and self-efficacy) directly or indirectly on the dependent variable (academic achievement). Based on the total effect, academic motivation has a significant total effect on academic achievement (β = .454; p < .001; CI: [0.388–0.521]).

Table 8. Mediation analysis

Effect type	Estimate	z-value	p
Direct	0.190	5.56	<.001
Indirect	0.264	7.82	<.001
Total	0.454	12.37	<.001

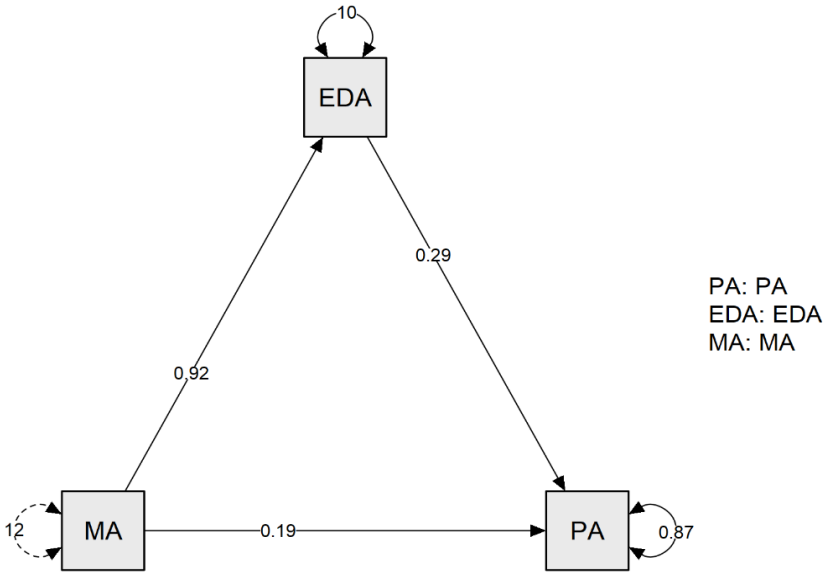

Figure 1.
Mediation analysis

The first finding to be explained in this study is the relationship between academic motivation and achievement. Based on the results of the analysis, the minor hypothesis in this study was accepted. There was a significant relationship between academic motivation and achievement (r = .70; p <.001). Several previous studies have explained that academic motivation has been confirmed to

have a relationship with and influence on academic achievement (Richardson et al., 2012). Based on other studies, low academic motivation can affect student academic achievement (Ananda et al., 2018; Hasibuan, 2019; Puspitha et al., 2018). Kusurkar et al. (2013) also explained that low academic motivation caused students to have low learning effort and low academic achievement.

Regarding psychological dynamics, academic motivation is consistently known to play an important role in academic achievement. According to the motivation-achievement cycle (Vu et al., 2022), academic motivation results from student perceptions about the value of the educational process. The higher the student's perception regarding the value of an educational process, the more students will have expectations of the results of the educational process that will be and is being undertaken.

The combination of positive values and expectations ultimately causes students to have high academic motivation. Conversely, students with negative values and expectations will have low academic motivation (Vu et al., 2021). According to Dembo and Seli (2012), academically motivated students have a high desire to succeed and have minimal fear of failure, most likely to be highly involved in academic activities and not worried about their achievements.

Furthermore, regarding the motivation-achievement cycle, Vu et al. (2021) explained that when students have high academic motivation, their academic achievement will be better. Because good quality and quantity of learning are necessary to strengthen it, the relationship between academic motivation and achievement in the motivation-achievement cycle is indirect. On this basis, other theories have explained that environmental factors such as the campus environment, classes, learning methods, and types of assignments given to students are important in increasing academic achievement (Dembo & Seli, 2012).

In addition to environmental factors strengthening the relationship between academic motivation and academic achievement, the authors hypothesize that internal factors such as academic self-efficacy also play a role in mediating the relationship between academic motivation and academic achievement. The hypothesis in this study has been accepted. This study found a significant relationship between academic self-efficacy and achievement ($r = .78$; $p < .001$). Several previous studies have explained the relationship between academic self-efficacy and academic achievement.

Hayat et al. (2020) involved 279 health or medical staff students at Shiraz University of Medical Sciences and found a significant relationship between academic self-efficacy and academic achievement ($r = .46$; $p < .001$). Then, in a study involving 300 student health workers, a significant relationship was found between academic self-efficacy and academic achievement ($r = .21$; $p < .001$) for student health workers (Suprajitno, 2022). In another study, a significant relationship was also found between academic self-efficacy and academic

achievement ($r = .54$; $p < .001$) in 218 student health workers (Kumalasari et al., 2021).

According to Hayat et al. (2020), students with high academic self-efficacy are characterized as having commitment, effort, and perseverance. Then, students with high academic self-efficacy attribute their failures to lower efforts rather than lower abilities. At the same time, those with low self-efficacy attribute their failures to their low abilities (Hayat et al., 2020). Furthermore, students with low academic self-efficacy are more likely to be afraid of doing assignments, avoid them, delay them, and give up immediately (Hayat et al., 2020).

In addition to academic self-efficacy being related to academic achievement, academic self-efficacy is proven to be a variable mediating the relationship between academic motivation and academic achievement ($\beta = .26$; $p < .001$; CI: [0.198-0.330]). Thus, the major hypothesis in this study is accepted empirically. Similar findings in this study have also been found in various studies on educational psychology. First, Seo (2008) studied 692 students and found that self-efficacy was a mediator between motivation and academics.

Furthermore, Balkis (2014), in his research involving 364 education faculty students at Pamukkale University, found that academic self-efficacy was empirically proven to mediate between academic motivation and achievement. Kahraman and Demirdelen Alrawadieh (2021) in their research also tried to test the role of self-efficacy on 276 students and found that academic self-efficacy had a mediator effect on the relationship between perceived education quality and the desire to continue education ($\beta = .11$ $p < 0.01$, CI: [0.051–0.196]). Furthermore, Pourkarimi and Mobinrahni (2018) examined 405 students and found that academic self-efficacy mediated the relationship between academic motivation and burnout.

Thus, academic self-efficacy is a variable that mediates the relationship between academic motivation and academic achievement. Conceptually, as previously explained in the motivation-achievement cycle (Vu et al., 2021), the psychological dynamics of the relationship between academic motivation and academic achievement are indirect because they must be mediated and strengthened by the quality and quantity of learning, which are represented by factors external (environmental) and internal (e.g., academic self-efficacy).

According to Honicke and Broadbent (2016), academic self-efficacy is a self-influence factor that motivates and regulates behavior. On that basis, academic self-efficacy can mediate the relationship between academic motivation and achievement. Low academic self-efficacy will directly make students amotivate (have low motivation) during the learning process (Ryan & Deci, 2020). However, if students have high academic self-efficacy toward their competence, this will increase their academic motivation in the learning process (Alderman, 2004; Cook & Artino, 2016; Hayat et al., 2020), ultimately affecting academic achievement (Vu et al., 2021).

Furthermore, this study confirms that the contribution of academic motivation and academic achievement to influencing academic achievement is 78%. Even though both are important for academic achievement, it is necessary to note that neither is the sole factor influencing academic achievement.

Other factors also contribute to influencing academic achievement, which is consistent with the findings of a meta-analysis where academic motivation and academic achievement are not the only single factors influencing academic achievement (Richardson et al., 2012). The meta-analysis review shows that several variables are important for academic achievement, including personality traits, motivation factors, and self-regulatory learning strategies (Richardson et al., 2012).

The importance of academic motivation and self-efficacy impacts academic achievement and can also influence and strengthen academic motivation. Students will be more motivated to learn if they have academic self-efficacy that arises from achieving past assignments. Conversely, if students do not have academic self-efficacy due to the experience of failing past assignments, then their motivation will be lower. Academic self-efficacy determines academic motivation (Vu et al., 2021).

CONCLUSION

Integrating academic motivation and self-efficacy is important for academic achievement in student health workers. The higher the academic motivation and self-efficacy, the higher the academic achievement. Academic self-efficacy significantly mediates the relationship between academic motivation and student academic achievement. Further research is needed to identify the sources of self-efficacy. So that it can be understood what sources of self-efficacy influence self-efficacy significantly and impact academic achievement. Besides that, This research is limited in its geographic scope, thus limiting its generalizability. Based on the findings of this study, it is recommended to retest the relationship between the relevant variables with different research subjects and different research environments.

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