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Research on Factors that Influence College Academic Performance: A Structural Equation Modelling Approach

Moesarofah

Universitas PGRI Adi Buana
Surabaya, INDONESIA

Immanuel Hitipeuw* 

Universitas Negeri Malang,
INDONESIA

Fulgentius Danardana

Murwani 
Universitas Negeri Malang,
INDONESIA

Marthen Pali 

Pelita Harapan University,
INDONESIA

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Abstract: This study used the structural equation modeling (SEM) approach to test a model that hypothesized the influence of self-efficacy, self-control, emotion, and engagement on student academic performance. The structural equation modeling model was developed to link all the study variables with a literature review to describe the interrelationship. Data collected were from 413 college students in their second year. The results show that self-efficacy, self-control, emotion, and engagement predict student academic performance. And through emotion and student engagement, both self-efficacy and self-control predict student academic performance indirectly. Practically the measures used in this study give more information about the learning environment in higher education settings than those usually come from traditional practices faculty received in the classroom, such as student rating forms and feedback. The main findings of this study have some implications for higher education, theory development, measurement, and future research.

Keywords: *Academic performance, emotion, engagement, self-control, self-efficacy.*

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Introduction

The study of academic performance abounds from year to year, but the problem of academic performance becomes more challenging as time progresses (Barton et al., 2021; Credé & Kuncel, 2008; Farooq et al., 2011; Maksum & Khory, 2020; Taber & Hackman, 1976). A few decades ago, the study of academic performance was often associated with cognitive factors (Haertel et al., 1983; Richardson et al., 2012) where an exclusive concentration was plentiful on cognition aspects. Meanwhile, non-cognition was limited. Non-cognitive skills have a predominant contribution to complementing cognitive skills in achieving academic success in higher education (Bowman et al., 2019; Duckworth & Yeager, 2015; Farrington et al., 2012).

Currently, researchers' interest in the construct of academic performance has shifted. Many studies of academic performance are associated with motivational constructs such as self-efficacy (Bui et al., 2017; Honicke & Broadbent, 2016), self-control (Siddiq et al., 2020; Tangney et al., 2008), academic emotion (Goetz et al., 2003; Pekrun & Stephens, 2010; Zhang et al., 2020), and engagement (Finn & Zimmer, 2012; Fredricks et al., 2004). The study of academic performance is related to the current era, namely the use of technology carried out by some researchers (Harper et al., 2021; Wentworth & Middleton, 2014), related to the use of smartphones (Kibona & Mgaya, 2015; Nayak, 2018), while related to learning strategies carried out by others (Neroni et al., 2019).

However, the latest research on the construct of academic performance has led to many theoretical models to find critical factors that affect academic performance in higher education. Researchers on academic performance had linked academic performance in higher education to personality predictors as a latent variable (McAbee et al., 2014), other linked the construct of academic performance with predictors of academic climate, thinking patterns, and curiosity (Maksum & Khory, 2020); meanwhile, some researchers link the construct of academic performance with predictors of engagement and academic behavioral skills (Siddiq et al., 2020).

* **Corresponding author:**

Immanuel Hitipeuw, Universitas Negeri Malang, Indonesia. ✉ immanuel.hitipeuw.fip@um.ac.id



In the Indonesian context, issues related to academic performance are still becoming a big issue, especially when looking at the Program for International Student Assessment (PISA) results of Indonesian students who continue to be in the low and below average categories (Organisation for Economic Cooperation and Development, 2019) both in reading, mathematics, and science. Various Antecedent factors show an average of more than one in three students arriving late and one in four students skipping class. Meanwhile, other students from different countries with high academic performance showed consistent hard work, not merely emphasizing cognitive factors (Moesarofah, 2018; Organisation for Economic Cooperation and Development, 2014). The academic performance of students who are low in reading, science, and mathematics abilities has linearity with the problems found among the average grade 12 students that do not achieve a minimum passing score in the national exam, and around 70 percent of Indonesian children are unable to show basic literacy in the PISA 2018 test (World Bank, 2020). This academic performance is certainly strongly suspected to be related to the symptoms of difficulties of Indonesian students in higher education in mastering science, and many of them end up dropping out of college (Jayani, 2021).

Data on Indonesian Higher Education Database (2020) showed the average student who dropped out of college in East Java was 7% (71.755 out of 1007427 students), and in 2018 (Higher Education Database, 2018) was 1% (3.966 out of 301160 students). The data above showed that the issue of personal quality is salient in academic performance. Personal qualities such as self-control and self-efficacy are principal in regulating oneself, and the belief to execute or perform an academic task is included (Artino, 2012; Muallifah et al., 2018; Nwagu et al., 2018; Schunk & Mullen, 2012). Self-control, furthermore, is a foremost concern that has relevance to academic behaviors such as academic engagement, increasing intrinsic motivation, including facing difficulties, and being able to satisfy basic human psychological needs (Chiviawosky et al., 2012; Deci & Ryan, 2008; Ryan & Deci, 2000). Self-control is not only adaptive but implies the ability to make choices in situations of limitation (Bowman et al., 2019; Thompson, 2021). Meanwhile, self-efficacy becomes an impetus to achieve success through confidence in the ability to complete definite academic tasks (Bandura, 1977; Maddux, 2012).

Other factors also related to academic performance are emotion and engagement. Emotion is an aspect that is always present in academic activity and determines the success or failure of studies (Ge, 2021; Jarrell et al., 2017; Pekrun, 2006; Sánchez-Álvarez et al., 2020). And engagement plays a key role in a student's energy to succeed academically through proactive behavior in an academic environment (Lei et al., 2018; Rajabalee et al., 2020; Tight, 2020). In addition to personal quality, this research also supports the importance of multidimensionality in measuring academic performance in higher education. As some researchers (Credé & Kuncel, 2008; Credé & Niehorster, 2009; McAbee et al., 2014; Taber & Hackman, 1976) suggest that academic performance must represent academic behavior in an intelligent, interpersonal and intrapersonal manner. These are different from general academic performance studies that use unidimensional in their measurements, namely academic scores or cumulative achievement indices.

Based on the previous studies on academic performance (Haertel et al., 1983; Richardson et al., 2012) that focus more on cognitive factors, and later studies that started with non-cognitive factors such as factors related to motivation (Bui et al., 2017; Finn & Zimmer, 2012; Fredricks et al., 2004; Goetz et al., 2003; Honicke & Broadbent, 2016; Pekrun & Stephens, 2010; Siddiq et al., 2020; Tangney et al., 2008; Zhang et al., 2020), the researchers interested in raising the influence of non-cognitive factors on academic performance.

Furthermore, studies on academic performance in higher education have not been widely done (Maksum & Khory, 2020; McAbee et al., 2014; Siddiq et al., 2020; Yokoyama, 2019). The latent variables studied frequently treat robust variables such as self-efficacy, emotion, and self-control (Fredricks et al., 2004; Maksum & Khory, 2020; Siddiq et al., 2020) as an aspect or dimension of another latent Variable. Based on these reviews, researchers concluded that building an academic performance model in higher education is still rare and examines it based on non-cognitive factors of students, namely self-efficacy, self-control, emotion, and engagement --- is still new. In light of the above gaps, this study aims to build a structural model, to test the influence of self-control, and self-efficacy, mediated by emotion and engagement toward academic performance.

Literature Review

Academic Performance in Higher Education

Generally, various literature studies reveal that academic performance is synonymous with academic success and measured through the grade point average (GPA) (Alam et al., 2014). This traditional opinion views academic performance solely in the cognitive realm, so GPA is used widely as a crucial indicator of academic performance in higher education.

However, some other experts argue that GPA has a low correlation to various test scores since assessment in colleges is more appropriate in a multidimensional direction (Beatty et al., 2015). When viewed from a psychological perspective, "performance" is related to the optimization of activity in a definite performance-oriented domain (Nitsch & Hackfort, 2016). Thus, in the educational context, academic performance leads to cognitive and non-cognitive dimensions such as leadership, communication skills, decision making, and others because it implies ability and effort. Rasberry et al. (2011), in a systematic review, define academic performance as synonymous with academic success grouped in three

dimensions: (1) cognitive skills and attitudes, (2) academic behaviors, and (3) academic achievement. The multidimensional concept of academic performance above is in line with Oswald, Schmitt, Kim, Ramsay, and Gillespie (Oswald et al., 2004). McAbee et al. (2014) argue that academic performance is an academic behavior that leads to academic success in higher education and covers intellectual, interpersonal, and intrapersonal dimensions.

Academic Performance from a Social Cognitive Theory Perspective

Social cognitive theory recognizes the importance of the social environment in learning and motivation. Academic behavior is inseparable from the existence of other factors. The theoretical framework provides several fundamental assumptions, namely: (a) the existence of reciprocal interactions between personal, behavioral, and environmental factors; (b) learning is related to motivation; (c) is enactive and vicarious (Schunk et al., 2013; Schunk & Zimmerman, 2003). Thus, individuals gain knowledge, beliefs, and emotions by observing others and acting on their thoughts, beliefs, values, and goals to be achieved. Academic performance as an academic behavior represents the cognitive and non-cognitive aspects of student achievement is influenced by personal factors such as self-control and self-efficacy. Self-control is delineated as a tendency to consider the potential disadvantages of a particular action that will arise in the long term (Mears et al., 2013). Baumeister was the initiator of the initial concept of self-control that connected the idea with the fundamental capacity of individuals who tend to control unwanted thoughts, feelings, and behaviors through inhibition to momentary temptation, and oriented toward long-term goals (Baumeister et al., 2007; Grund & Carstens, 2019). The same opinion is expressed by Tangney et al. (Tangney et al., 2008), in which self-control is delineated as the ability to override the tendency to unwanted behavior (impulsiveness) by distancing oneself from the action. Thus, self-control is a form of necessity, that is, to exercise control over definitive actions through deliberate inhibition for the long-term good. Individuals with low self-control are not capable of resisting temptation nor considering negative consequences, so they tend to behave impulsively and insensitively to the environment (Mears et al., 2013).

Self-control is two-sided. On the one hand, it depends on limited resources. So, the capacity of self-control capacity, when, had been deployed on the first task, another task performance will decrease. This phenomenon is termed the ego depletion effect by Baumeister (Grund & Carstens, 2019; Job & Walton, 2017). However, in recent studies on the ego depletion effect, they may be addressed by improving motivation, positive mood, and personal goals (Inzlicht et al., 2014; Inzlicht & Schmeichel, 2012). Thus, individual beliefs in self-control are subjective, whether self-control is a limited or non-limited resource, malleable or fixed (Job & Walton, 2017).

Meanwhile, self-efficacy is a perception of the ability of an individual to complete a definite task. Self-efficacy becomes an internal reward that affects the desired academic effort and achievement. In higher education, self-efficacy represents a level of a student's self-confidence through various performances about success in completing definite tasks in college (Gore, 2006; Vuong et al., 2010). Students' self-confidence in their academic abilities is the primary capital to achieving academic success in higher education. In an educational context, self-efficacy relates to learning assessments that can generate positive or negative emotions. Students with high self-efficacy tend to perceive difficulties as a challenge that gives rise to positive emotional behavior and vice versa (Pekrun, 2006; Putwain et al., 2013). In addition, self-efficacy also plays a salient role in engagement through various efforts and perseverance made by students to achieve high academic performance, such as predetermined educational goals (Lin et al., 2014; Schunk & Mullen, 2012).

Emotions in academic situations play a salient role in increasing or stopping student learning activities. Positive emotions become psychological self-strengthening as they signal the optimal running of functions. Positive emotions motivate students to be involved cognitively, affectively, and behaviorally in the academic environment (Ge, 2021; Inzlicht et al., 2015; Utami & Hitipeuw, 2019).

Meanwhile, the meaning of engagement is as an energy that moves students through a continuum in an academic environment through cognitive, affective, and behavioral indicators (Bedenlier et al., 2020; Bond & Bedenlier, 2019). Engagement relates to academic performance. On the contrary, academically disengagement carries the consequences of failure or dropping out of college (Finn & Zimmer, 2012; Fredricks et al., 2004).

Based on the description above, this study aimed to explore the influence non-cognitive factors have on academic performance. Specifically, the main focus was twofold: a) to investigate whether the influence of self-control and self-efficacy, directly and indirectly through emotion and engagement, were significant toward academic performance or not; b) to develop a structural equation model to explain the interrelationship among the study variables (self-control, self-efficacy, emotion, engagement, academic performance).

And based on the purpose, the research hypothesis was derived as follows: the major hypothesis is that the structural equation model of academic performance is significant and built by self-control, self-efficacy with emotion, and engagement as mediators". While the minor hypotheses are as follows:

H1: Self-control has a significant positive effect on academic performance.

H2: Self-efficacy has a positive effect on academic performance significantly.

H3: Self-control has a positive effect on academic performance through emotion significantly.

H4: Self-control has a positive effect on engagement through emotion significantly.

H5: Self-efficacy has a positive effect on academic performance through emotion significantly.

H6: Self-efficacy has a positive effect on academic performance through engagement significantly.

Methodology

Research Design

This research is a cross-sectional and survey study. It focuses on variables from a specific period and surveys the key variables of this research on academic performance. Then the authors explored the relationship among the variables to test whether theoretical models get empirical support.

Participants

The research data was collected using the following cluster random sampling technique. Participants are students of Psychology and Economics in the second year, coming from five (5) private universities in Surabaya, East Java which geographically represent areas in East, South, West, and Central Surabaya. There were five selected private colleges after obtaining permission from the Colleges, and their total number of students was 1835. Participants who responded correctly were 490 people, and after random selection, there were 413 people consisting of 110 males and 303 females, with an average age of 18-25 years.

Instrument

There are five instruments for collecting data and adapted from previous studies. The adaptation scale procedures carried out include back-to-back-translation, adaptation, and scoring scales. Validity and reliability Instruments used confirmatory factor analysis. All instruments are valid with factor loading for each item ≥ 0.5 . While the Coefficient of Cronbach's alpha for each instrument >0.6 -- means reliable.

The measurement of the self-control construct from the Brief Self-control Scale (BSCS) (Lindner et al., 2015) is based on the theory of Tangney et al. (Tangney et al., 2008). It measures the dimensions of (1) maintaining self-discipline in an academic task and (2) controlling unwanted behavior. It consists of 13 items. It shows the factor loadings for each item range from 0.796 to 0.890 (>0.50 valid). And the reliability coefficient of Cronbach's alpha = 0.80 >0.60 (reliable).

The measurement of self-efficacy constructs is adapted from the College Self-Efficacy Inventory (CSEI) developed by Solberg et al. (1993), measuring the dimensions of (1) lecture material, (2) social interaction, and (3) classmates; it consists of 19 items. Factor loadings each item 0.856 to 0.923; and the reliability coefficient of Cronbach's alpha = 0.923 >0.60 (reliable).

The measurement of the emotion construct from the Short Version of the Academic emotions Questionnaire for Filipinos (S-AEQ-F) is based on the concept of Pekrun et al. (Pekrun et al., 2011). It measures the dimensions of (1) pleasant emotions in certain academic situations and (2) unpleasant emotions in a certain academic situation. It consists of 16 items. Factor loadings for each item range from 0.741 to 0.857 (>0.50 valid), and the reliability coefficient of Cronbach's alpha = 0.833 >0.60 (reliable).

The measurement of the Engagement construct is from the University Student Engagement Inventory (USEI) developed by Fredricks et al. (2004), which measures the dimensions of (1) behavior engagement, (2) emotion engagement, and (3) cognitive engagement. It consists of 15 items. Academic Engagement has loading factor for each item range from 0.803 to 0.922 (> 0.50 valid), and the reliability coefficient of Cronbach's alpha = 0.875 > 0.60 (reliable).

The measurement of the academic performance construct is from the scale of academic performance in higher education (McAbee et al., 2014) measured in dimensions of (1) intelligent behavior in major academic activities and support, (2) interpersonal behavior in formal lectures and informal social situations, (3) psychological strength in supporting academic success; overall consisting of 11 items. The adaptation of the Academic Performance scale in higher education has factor loading for each item range from 0.760 to 0.854 (>0.50 valid), and the reliability coefficient of Cronbach's alpha = 0.757 >0.60 (reliable).

Procedures

Undergraduate students from five universities majoring in psychology and economics are selected. The researchers administered the questionnaires (with permission) directly to participants who voluntarily participated. After all participating students had completed the questionnaires or surveys, the researchers collected the materials for being analyzed to answer the hypothesis.

Data Analysis

Data analysis was administered that included descriptive statistics for the sample, confirmatory factor analysis (CFA), the goodness of fit indices for the measurement model, and structural equation modelling. And before testing the hypothesis, researchers conducted a normality test, outliers, and multi-collinearity. The results showed data normally distributed where the highest CR-multivariate of 2,193 (≤ 2.58) after eliminating the outlier's data. While the univariate Outliers test obtained a Z score of ≤ 2.8 , and the multivariate outlier of 34.09 was smaller than the Mahalanobis, which means that the data from 413 respondents did not have multivariate outliers. Furthermore, there is no evidence of multi-collinearity between variables, where tolerance stretches from 0.78 – 0.893 (≥ 0.10) and a variable with the highest VIF coefficient is 1.67 that less than 10.00.

Results

Descriptive Variables

The following in table 1 are the results of descriptive statistics of variables. Based on the table, it is known that the mean value for all variables range from 2.00 (self-control) to 3.93 (self-efficacy), and SD range from 0.51 (self-efficacy) to 0.74 (academic performance).

Table 1. Descriptive Statistics of Variables

Variables	M	SD	1	2	3	4	5
1 Self-Efficacy	3.93	0.51	1.00				
2 Self-Control	2.88	0.57	0.12*	1.00			
3 Emotion	2.95	0.72	0.46**	0.20**	1.00		
4 Engagement	3.65	0.57	0.23**	0.08	0.27**	1.00	
5 Academic Performance	3.29	0.74	0.49**	0.20**	0.67**	0.38**	1.00

* $p < 0.05$, ** $p < 0.01$, N=413

Factor Confirmatory Analysis

Table 2. Factor Confirmatory Analysis

Variable	Indicator	Factor Loading (>0,5)	t-value	AVE (>0,5)	CR (>0,6)
Self-Efficacy	SE1	0.86	22.90	0.695	0.872
	SE2	0.85	22.38		
	SE3	0.78	19.70		
Self-Control	SE4	0.84	11.07	0.697	0.822
	SE5	0.83	10.93		
Emotion	EM1	0.56	17.36	0.506	0.889
	EM2	0.64	21.66		
	EM3	0.58	20.26		
	EM4	0.73	22.91		
	EM5	0.72	22.24		
	EM6	0.87	23.21		
	EM7	0.69	18.62		
	EM8	0.84	22.05		
Engagement	EN1	0.85	22.66	0.746	0.894
	EN2	0.86	23.18		
	EN3	0.88	24.26		
Academic Participant	PA1	0.84	22.70	0.636	0.951
	PA2	0.82	21.76		
	PA3	0.80	18.12		
	PA4	0.73	20.93		
	PA5	0.80	21.03		
	PA6	0.80	21.09		
	PA7	0.80	20.99		
	PA8	0.77	19.83		
	PA9	0.81	21.17		
	PA10	0.82	21.66		
	PA11	0.78	20.09		

Table 2 shows the results of calculating the validity of indicators using factor loading values. The results showed that all indicators have loading factor values of >0.5 and with t-value ≥ 1.96. Also, each variable has an AV value of >0.5 and CR >0.7. And this means that all variables on the model have good construct validity and good composite reliability.

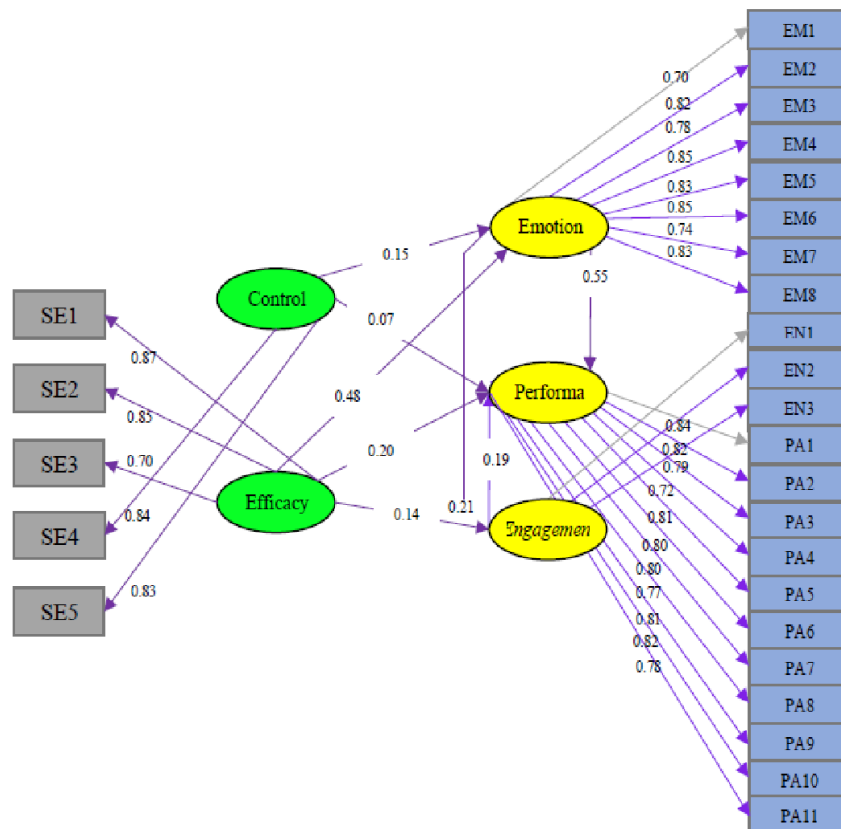
Test Goodness of Fit Overall Model

SEM analysis results for the goodness of fit for the structural models of academic performance are shown in table 3.

Table 3. Test Goodness of Fit Overall Model

Criteria	Cut-off value	Results	Remark
Chi-square	small	350.29	
P-value	≥ 0.05	0.077	fit
RMSEA	≤ 0.08	0.017	fit
GFI	≥ 0.90	0.94	fit
AGFI	≥ 0.90	0.93	fit

Based on table 3, the goodness of fit for the overall model has met the requirements within acceptable limits (Browne & Cudeck, 1992; Byrne, 1998; Diamantopoulos & Siguaw, 2000; Schumacker & Lomax, 2004) so that the model can be said to be good fit (see figure 1).



Chi-Square = 350.29, df = 314, p-value = 0.07746,
 RMSEA = 0.017, GFI = 0.94 AGFI = 0.93

Figure 1. Structural Equation Modelling of Academic Performance

Hypothesis Tests

The major hypothesis: *The structural equation model of academic performance is significant and built by self-control, self-efficacy with emotion, and engagement as mediators* proven fit based on table 3 above. It means that the theoretical models get empiric support. Based on the fit of the model to the data, the next step was to interpret the paths to test the minor hypotheses. And the results of minor hypotheses in this study are described in the following table 4:

Table 4. Hypothesis Test Results

Hypothesizes for direct influence		Coef.	t-value	Results
H1	Self-Control → Academic Performance	0.07	1.74	Rejected
H2	Self-Efficacy → Academic Performance	0.20	4.39	Accepted
Hypothesizes for indirect influence		Coef.	p-value (Sobel Test)	Results
H3	Self-Control → Emotion → Academic Performance	0.085	0.004	Accepted
H4	Self-Control → Emotion → Engagement	0.031	0.024	Accepted
H5	Self-Efficacy → Emotion → Academic Performance	0.264	0.000	Accepted
H6	Self-Efficacy → Engagement → Academic Performance	0.027	0.041	Accepted

Based on table 4, the direct influence for H1 (first hypothesis) showed that the path from self-control to academic performance (H1) has a regression coefficient of 0.07, but it was not significant because the t-value (1.74) \leq t-table (1.96); so, it was rejected. But the direct influence for H2 (second hypothesis) showed it has a regression coefficient of 0.20 and significant with the t-value (4.39) \geq t-table (1.96); so, it was accepted. And other hypotheses (H2, H3, H4, H5, and H6) to measure the indirect influence using Sobel test, showed that all paths are positive and statistically significant with p-value \leq 0.05, so all hypotheses are accepted. These results established that self-control and self-efficacy through emotion and engagement would positively and significantly influence academic performance. And Self-efficacy has a direct and significant influence on academic performance.

Discussion

The researchers propose theoretical models of self-control, self-efficacy, emotion, engagement, and academic performance derived from previous studies. The hypothesis tested uses SEM and the goodness-of-fit of the overall model. Based on the results of the SEM analysis, self-control did not have a significant direct effect on academic performance, but the influence of self-control on the academic performance needed to be mediated by emotion. Meanwhile, self-efficacy has shown a direct impact on academic performance significantly, meaning that self-efficacy is a strong predictor of academic performance. And findings of this study, furthermore, will be discussed as follows:

The major hypothesis of academic performance models built on self-control, self-efficacy with emotion & engagement as a mediator --- has been proven. The fit criteria in the model (table 3) demonstrate that academic performance is not only influenced by cognitive factors such as academic scores and grade point average (GPA) that are common in the academic world and research. The fact is that in a global era where abundant sources of information and ease of technology require personal qualifications such as self-control and self-efficacy rather than just cognitive skills (Hakyemez & Mardikyan, 2021; Kader, 2022; Tang et al., 2022).

The direct effect of self-control on academic performance (H1) shows a coefficient (0.070) with a t-value of 1.74 < 1.96 (t-table). It means there is no significant direct influence between self-control and academic performance. This result means that good or bad self-control does not affect high or low academic performance. And so far, self-control focuses more on the inhibition of unwanted behavior, not the promotion of behavioral targets (Duckworth et al., 2019; Zettler, 2021). Based on the self-control scale, items are more of a hindrance to unwanted behavior (de Ridder et al., 2012), so it is possible that the self-control scale more consistently explains unwanted behavior. Various studies have also shown that the continuous deployment of self-control has consequences that will hinder performance. Self-control is related to ego depletion in which a decrease in resources or self-capacity in the second task after being drained to complete the first task, such as the dual-task paradigm (Baumeister, 2016; Martela et al., 2016).

The direct effect of self-efficacy on academic performance (H2) showed a coefficient of 0.20 with a t-value of 4.39 > 1.96 that there was a significant direct influence between self-efficacy and academic performance. This result in line with some studies done by other researchers (Honicke & Broadbent, 2016; Yokoyama, 2019). Reviewed social cognitive theory shows that the combination of social systems externally and personal factors internally motivates and regulates behavior (Bandura, 2012; Schunk & Pajares, 2002). The personal factor related to self-efficacy is the main component in the student's assessment of his ability to organize and carry out actions to achieve the desired performance (Bandura, 1977). Students with high self-efficacy tend to pursue their chosen activities and survive in the face of obstacles with various efforts to overcome difficulties. Various works of literature support the correlation between self-efficacy beliefs for academic tasks and academic performance (Alegre, 2014; Caprara et al., 2011; Gore, 2006; Shkullaku, 2013).

The indirect influence of self-control on academic performance through emotion (H3) showed a positive effect. Referring to the control-value theory of academic emotions (Pekrun, 2006), emotion is the mediator of self-control and academic performance. However, for self-control to persist as a reward for a long period, it needs a positive emotion as a mediator to restrain impulses or override individual responses to be in line with meaningful standards such as goals, values, and social expectations (Baumeister et al., 2007; Schmeichel & Vohs, 2009). These findings also are in line with empirical evidence from other researchers (Gailliot et al., 2014; Gordeeva et al., 2017; Villavicencio & Bernardo, 2013) that positive emotions such as pleasure and hope become mediators between self-control and academic performance.

Self-control includes cognitive and motivational processes that need to be accompanied by positive emotions when dealing with academic tasks and assessments of the educational situation.

The indirect influence of self-control on engagement through emotion (H4) showed a positive effect. According to the theory of value control (Pekrun, 2006), self-control is an antecedent of academic emotions, which further play a role as a driving force to engage or move away from the instructional situation. Pleasant emotions appear when the person can control the desired activity or learning outcome, and on the contrary, unpleasant ones appear when the activity or learning outcome is threatening or boring (D'Errico et al., 2016; King & Gaerlan, 2014; Pekrun et al., 2002). Pleasant emotions may lead to an expansion of cognitive focus that will increase effort and perseverance. On the contrary, unpleasant ones will narrow the focus to the threat at the expense of the resources possessed.

The indirect influence of self-efficacy on academic performance through emotion (H5) showed a positive effect. Based on the theory of self-efficacy from Bandura (Bandura, 2012) that students who have an efficacy view will foster intrinsic interest and feelings of pleasure in various activities. They set challenging goals and maintain a strong commitment to achieving predetermined goals. On the contrary, students who doubt their abilities will avoid tasks they perceive as personal threats that further weaken their commitment to pursuing desired academic goals. Students in the developmental stages of late adolescence to early adulthood are in a salient period of obtaining academic and social competencies inseparable from stressful experiences. Moreover, self-efficacy affects students in feelings, thinking, motivating themselves, and behaving to find productive solutions to the problems faced, and are challenged to pursue the desired academic goals (Hayat et al., 2020; Vuong et al., 2010).

The indirect influence of self-efficacy on academic performance through engagement (H6) showed a positive effect. The results of studies conducted by some researchers (Brewer & Yucedag-Ozcan, 2013; Putwain et al., 2013) found that self-efficacy affects academic success through efforts and perseverance. This study is in line with the view from Bandura (Bandura, 1994) about self-efficacy that individuals with high self-efficacy perceive tough tasks as challenges. They have to be mastered, not as avoided threats. So, views like this foster intrinsic interest in various academic activities to maintain a strong commitment to achieving academic performance as expected.

The results of this research expand the previous studies done by other researchers. Each of non-cognitive factors affects the academic performance. In previous studies, the cognitive factors (self-efficacy, self-control, and emotion) had been categorized into one construct or variable (Maksum & Khory, 2020; Siddiq et al., 2020), but here, the researchers studied each of cognitive factors as a separate entity as a variable. And the results show that each of them do have an influence on the academic performance of the college students. The results imply that in college level, non-cognitive factors need to be considered carefully by those in universities as factors that can help improve the education of the students.

Conclusion

Overall, the results of this structure of academic performance model support previous research, except that the relationship between self-control and academic performance requires emotion as mediator variables. These findings provide a framework for explaining academic performance from personal qualities, namely the motivational strengths of students. This study is different from previous studies that have linked many academic performance constructs with external factors such as demographics, learning strategies, and the use of technology and information.

The implications of this study indicate the importance of students in maintaining self-control in situations of limitations faced through strengthening self-motivation and rewards accompanied by the belief of self-efficacy as the initial capital to achieve academic success in higher education. Positive emotions should be maintained so that learning becomes a flowing pleasure for a student, and energy to be actively involved in the academic community.

Recommendations

This study showed that academic performance is influenced by self-efficacy, self-control, emotion, and engagement. For future studies, researchers can implement different research designs that can include experimental or longitudinal study designs to validate the findings.

Limitations

The academic performance in this study was conducted only among students from the psychology and economics department. Conducting a similar study that includes students from various departments including those from social and natural sciences may result in a different finding.

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Authorship Contribution Statement

Moesarofah: Critical revision of manuscript, conducting the research, supervision, final approval. Hitipeuw: Conceptualization and design, analyzing the data, writing the draft, review and editing. Pali and Murwani: Conceptualization, data acquisition, statistical analysis, technical or material support, review and editing.

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