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Moderating Role of Self Study Time on Goal Orientation and Academic Performance: Evidence from a Foundational Course in Vietnamese Higher Education

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Abstract— *This study examines the moderating role of self study time on the relationship between goal orientation and academic performance in a foundational Mathematics course at a Vietnamese public university. Data were collected from 820 second-year economics and business students using a self-administered questionnaire measuring expectancy for success, task value, and goal orientation. Self study time was categorized as 24 hours per day versus other amounts. Academic performance was the actual course grade. Ordinary least squares regression with bootstrap standard errors (1,000 replications) was employed to ensure robust inference. Results indicate that both expectancy for success and goal orientation have statistically significant positive effects on course grade. More importantly, the interaction between goal orientation and self-study time (24 hours/day) is negative and significant. This means that for students who study 24 hours per day, the beneficial impact of goal orientation on performance is significantly weaker compared to those who study less – a finding we term the "self-study paradox." The results suggest that while goal orientation is generally advantageous, its added value diminishes when students already invest sufficient self-study time. Practical implications include tailoring motivational interventions to students' self-study habits and focusing on study quality rather than merely increasing study hours.*

Keywords— *Goal orientation, self study time, academic performance, moderation, higher education.*

I. Introduction

In higher education, foundational courses play a critical role by providing essential knowledge and skills, thereby laying the groundwork for mastering subsequent specialized subjects (Wolters & Brady, 2021). Nevertheless, many students do not genuinely prioritize these courses. Instead, they allocate considerable time to other activities such as part-time employment, both to increase their income and to gain social experience. This often leads to low academic performance in foundational courses, with some students receiving academic warnings or even being forced to drop out (Cor & Brocks, 2018). At many Vietnamese universities, the rate of student dropout or forced withdrawal is relatively high, causing a substantial waste of resources for society as a whole (Hóa et al., 2018).

Success in foundational courses is not merely a criterion for assessing current ability; it is also an important predictor of subsequent performance in specialized courses. Numerous studies have shown that academic results in prerequisite courses significantly influence later student success (Abdel-Salam et al., 2023; Adeyemi-Bello et al., 2011). Specifically, learners who achieve high scores in foundational courses tend to obtain higher grades in specialized subjects. This underscores the importance of foundational courses as a solid basis for students' long-term academic development.

Among the factors affecting academic performance, learning motivation is considered pivotal. The Expectancy-Value Theory (EVT) proposed by (J. Eccles & Wigfield, 2002) identifies two main components of learning motivation: expectancy for success (belief in one's ability to complete a task) and task value (the perceived importance, usefulness, or interest of the task). In addition, the Goal Orientation Theory (GOT) of (Elliot & Mcgregor, 2001) posits that learning motivation is shaped by two types of orientation: mastery orientation – focusing on developing competence and deep understanding, and performance orientation – focusing on demonstrating ability and outperforming others.

The impact of motivational factors on academic performance may vary depending on students' specific learning behaviors, particularly self-study time. Self-study is regarded as an important behavior reflecting self-regulation in learning; students who spend more time on self-study generally have greater opportunities to consolidate knowledge and prepare for lessons (Crede & Kuncel, 2008a). Nevertheless, few studies have examined whether self-study time moderates the effect of goal orientation on academic performance, especially in the context of foundational courses in Vietnamese higher education.

Theoretically, two moderating mechanisms of self-study time in this relationship can be proposed. First, self-study may amplify the effect of goal orientation: if students have a clear orientation and invest substantial self-study time, they will achieve higher results. (Senko et al., 2013) showed that mastery goal orientation encourages students to allocate study time strategically to interesting content, thereby enhancing learning effectiveness. Second, self-study may weaken (substitute for) the role of goal orientation if the self-study behavior is already strong enough to compensate for a lack of motivation. (Theobald, 2024) demonstrated a compensatory effect between

self-study time and study strategies: when study strategies are effective, students need less self-study time to reach the same level of goal attainment. This finding implies that high-quality self-study can compensate for motivational deficits, thereby reducing the direct impact of goal orientation on academic performance.

Therefore, this study is designed to examine the direct effects of expectancy for success, task value, and goal orientation on foundational course performance, and to assess the moderating role of self-study time on the relationship between goal orientation and academic performance. Several other factors are also included in the model as control variables to increase estimation accuracy. The study addresses the following research question:

RQ: Does self-study time moderate the influence of goal orientation on foundational course performance?

II. Literature Overview

2.1 The influence of goal orientation on academic performance

Goal orientation is a key construct within achievement motivation theory, reflecting "an individual's tendency to prioritize certain types of goals in achievement situations" (Payne et al., 2007). Building on the foundation of (Dweck, 1986), goal orientation is typically classified into two main types: mastery goal orientation – focusing on developing competence and deep understanding of knowledge – and performance goal orientation – focusing on demonstrating ability and outperforming others. These two types are further subdivided into approach and avoidance dimensions (Elliot & Mcgregor, 2001).

Numerous empirical studies have demonstrated the positive effect of goal orientation, particularly mastery goal orientation, on academic performance. A meta-analysis by (Noordzij et al., 2021), synthesizing 90 studies with 11,247 participants, revealed that compared to approach performance orientation, avoidance orientation, or having no goals, approach mastery orientation has a significantly positive effect on academic outcomes. Similarly, a large-scale meta-analysis by (Richardson et al., 2012a) concluded that psychological factors, including goal orientation, are significantly correlated with university students' grade point average (GPA).

In the Vietnamese context, a study by (Điều, 2015) on 989 students at Ho Chi Minh City University of Education showed that students rated specific learning purposes (which imply clear goal orientation) highly, and that these purposes were closely related to learning motivation. Thus, there is a solid basis to assert that goal orientation, especially mastery orientation, has a positive impact on academic performance.

Hypothesis H1: Goal orientation has a positive effect on foundational course performance.

2.2 The influence of expectancy for success and task value on academic performance

Beyond goal orientation, expectancy for success and task value are two central components of the expectancy-value theory developed by (Eccles et al., 1983). This theory posits that an individual's learning motivation is determined by their belief in their ability to complete a task (expectancy) and their evaluation of the task's importance, usefulness, or intrinsic interest (value).

A substantial body of empirical research has shown that both components significantly affect academic performance. A meta-analysis by (Schneider & Preckel, 2017), synthesizing 261 studies, found a moderate to strong positive correlation between expectancy for success and actual academic outcomes. Furthermore, when students perceive a learning task as valuable (interesting, important, or useful), they tend to engage more actively and achieve higher performance (Linnenbrink-Garcia & Barger, 2014).

2.3 Self-study time as a moderator

Self-study is a central behavior of self-regulated learning, reflecting students' ability to proactively manage their time, content, and learning strategies outside the classroom. In the university environment, where demands are highly self-directed, self-study time is considered a critical resource determining academic success (Crede & Kuncel, 2008b). A recent meta-analysis by (Liu et al., 2026) found that self-study time has a moderate positive correlation with university students' academic performance ($r = 0.25$), and this effect is particularly pronounced at the tertiary level.

Although many studies have examined the direct effect of self-study time on academic performance, few have investigated whether self-study time moderates the influence of goal orientation on academic outcomes. Theoretically, two moderating mechanisms can be proposed. First, self-study time may amplify the effect of goal orientation: students who have a clear orientation and devote substantial time to self-study will achieve higher results. Second, self-study time may weaken the role of goal orientation if the self-study behavior is already strong enough to compensate for a lack of motivation (a substitution effect). An experimental study by (Islam et al., 2024) on the impact of goal setting found that although goal setting significantly increased study time and effort, its effect on test scores was not statistically significant, suggesting that self-study behavior may partially substitute for the direct effect of goal orientation.

Hypothesis H2: Self-study time moderates the effect of goal orientation on academic performance, such that when students study more, the influence of goal orientation on performance becomes weaker (negative interaction).

In addition to the motivational variables, the study includes several control variables to increase estimation accuracy. Specifically, prior academic ability (high school graduation exam score in Mathematics) is controlled because it is one of the strongest predictors of university academic performance (Crede & Kuncel, 2008a); including this variable helps disentangle the effect of motivation from that of baseline ability. Furthermore, gender is controlled to account for differences in academic performance between male and female students, as documented in empirical research (Richardson et al., 2012b).

III. Research Methodology

3.1 Data collection

The study was conducted on 820 second-year students at a public university belonging to the economics and business sector in Vietnam. All participants were enrolled in a foundational Mathematics course, which is a compulsory component of the early-stage curriculum. The sample was selected using stratified sampling, where the strata were defined by academic departments or majors, and the sample size for each stratum was allocated proportionally to the number of students in that department. Regarding demographic characteristics, the proportion of female students was 83%, reflecting the typical enrollment pattern of economics-oriented universities in Vietnam, where female students generally outnumber their male counterparts.

3.2. Measurement instruments

All data were collected using a self-administered questionnaire completed directly by the students. The variables described in this section include: the dependent variable – foundational course performance; the independent variables – three components of learning motivation (task value, expectancy for success, and goal orientation); the moderating variable – self-study time; and the control variables (gender and prior academic ability – high school graduation score in Mathematics). After collection, the data were entered and processed using Stata 17.0. Specifically:

Foundational course performance (Grade_f). The study selected the foundational Mathematics course as the representative foundational course. Hence, foundational course performance was measured by the actual grade obtained in that Mathematics course, ranging from 0 to 10.

Learning motivation variables. The three motivational components – task value, expectancy for success, and goal orientation – were measured using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The scales for task value and expectancy for success were adapted from (Wigfield & Eccles, 2000) based on expectancy-value theory (EVT), while the goal orientation scale was developed from (Elliot & Mcgregor, 2001) following goal orientation theory (GOT). Specifically, the task value scale for the foundational course consisted of five observed items (Vf1–Vf5); the expectancy for success scale comprised three items (Ef1–Ef3); and the goal orientation scale included eight items (Go1–Go8).

To assess the quality of the measurement scales, confirmatory factor analysis (CFA) was performed for each construct. The results showed that the measurement model achieved composite reliability (CR) and Cronbach's alpha coefficients all exceeding 0.7, while the average variance extracted (AVE) surpassed the threshold of 0.5, confirming convergent validity. Moreover, discriminant validity was established as the square root of the AVE for each construct was larger than its correlations with other constructs. The fit indices of the CFA model (CFI, TLI, RMSEA) all met the recommended thresholds, indicating that the measurement structure was appropriate for the actual data.

Self-study time (study_time). This variable was measured by a single question: "How many hours per day do you typically spend on self-study?" with four response options. However, to facilitate moderation analysis, we created a dummy variable named *study_time* taking the value 1 if students studied 2–4 hours per day and 0 otherwise. This categorization was based on descriptive statistics showing that the 2–4 hour self-study group exhibited a distinctly different effect on academic performance.

Prior academic ability (MaScore). To control for the influence of baseline academic ability, the study used students' high school graduation examination scores in Mathematics (on a scale of 0–10).

Gender. Gender was included as a control variable, coded as 1 for male and 2 for female. This allowed us to account for potential gender-based differences in academic performance, which have been documented in previous empirical research (Richardson et al., 2012b).

3.3. Data analysis procedure

The data analysis proceeded in a structured manner. First, the normality of the dependent variable and residuals was examined using the Shapiro–Wilk test (suitable for moderate sample sizes) as well as skewness and kurtosis tests. If violations of normality were detected, subsequent steps would be adjusted to ensure reliable inferences.

Second, given the cross-sectional nature of the data, diagnostic checks for multicollinearity (variance inflation factor, VIF) and heteroscedasticity (Breusch–Pagan test) were performed. If serious multicollinearity were detected, the relevant variables would be considered for removal or combination. If the assumption of constant variance were violated, the bootstrap method with 1,000 replications would be applied to obtain robust standard errors, thereby ensuring that statistical inferences do not rely on the assumption of normally distributed residuals.

Finally, the regression model was specified to test the direct effects of motivational factors (task value, expectancy for success, and goal orientation) in the foundational course, as well as the moderating role of self-study time. The equation is as follows:

$$Grade\_f = \beta_0 + \beta_1 \cdot Vf + \beta_2 \cdot Ef + \beta_3 \cdot Gf + \beta_4 \cdot Gender + \beta_5 \cdot MaScore + \beta_6 \cdot study\_time + \beta_7 \cdot (Gf\_x\_study\_time) + \varepsilon$$

in which:

- *Grade_f* = foundational course grade (General mathematics);
- *Vf* = task value;
- *Ef* = expectancy for success;
- *Gf* = goal orientation;
- *Gender* = binary variable, coded 1 for male, 2 for female;
- *MaScore* = high school graduation exam score in Mathematics;
- *study_time* = dummy variable, taking 1 if self-study time is 2–4 hours/day and 0 otherwise;
- *Gf_x_ study_time* = interaction term between goal orientation and self-study time;
- ε = random error.

In summary, the combination of diagnostic testing and bootstrap estimation ensures that the coefficient estimates and statistical inferences in this study are reliable, even when the

data do not satisfy the classical assumptions of linear regression.

IV. RESULTS

4.1. Descriptive statistics

Table 1 presents the descriptive statistics for the continuous variables used in the regression model.

TABLE 1. Descriptive statistics (n = 820)

Variable	Mean	Std. Dev.	Min	Max
Grade_f	8.035	1.141	4.2	9.8
Vf	0	.761	-3.029	1.312
Ef	0	.786	-3.1	1.65
Gf	0	.656	-3.077	.968
MaScore	8.934	.387	7.4	9.6

Note: Vf, Ef, and Gf are factor scores (standardized, mean ≈ 0, SD ≈ 1).

Among the 820 survey respondents, female students accounted for 83.2%, while male students made up 16.8%. Regarding self-study time, the proportion of students who studied 2–4 hours per day (study_time = 1) was 47.1%, and the remaining group (studying less than 2 hours or more than 4 hours) accounted for 52.9%.

4.2. Hypothesis testing results

Prior to estimating the model, diagnostic checks were conducted to assess data quality. Multicollinearity was examined using the variance inflation factor (VIF). The results showed that the VIF values for all independent variables were below 2.04, with a mean VIF of 1.37, confirming that no serious multicollinearity was present in the model (Hair et al., 2010). Next, the Breusch–Pagan test for heteroscedasticity yielded a $\chi^2(1) = 36.99$ with $p < 0.001$, rejecting the null hypothesis of constant variance. This indicated that the OLS model suffered from heteroscedasticity. To address this issue while ensuring that statistical inferences do not rely on the normality assumption of residuals, we employed the bootstrap method with 1,000 replications to estimate robust standard errors and confidence intervals (Efron & Tibshirani, 1994).

Table 2 presents the bootstrap linear regression estimates for the moderating model of self-study time on goal orientation.

TABLE 2. Bootstrap linear regression estimates

Variables	Grade_f
Ef	0.294***
	(0.0625)
Gf	0.365***
	(0.0904)
MaScore	0.361***
	(0.0969)
Gender	0.199*
	(0.111)
study_time	0.173**
	(0.0733)
Gf_x_study_time	-0.271**
	(0.134)
Constant	4.378***
	(0.891)
Observations	820
R-squared	0.149

Note: *** p<0.001, ** p<0.05, * p<0.1. Standard errors in parentheses

The results show that expectancy for success (Ef) has a positive and statistically significant effect at the 0.1% level ($\beta = 0.294$, $p < 0.001$). This confirms that the more students believe in their ability to complete academic tasks, the higher their grades, which is consistent with expectancy-value theory (EVT). Similarly, goal orientation (Gf) also exhibits a strong positive influence on academic performance ($\beta = 0.365$, $p < 0.001$), supporting Hypothesis H1.

Prior academic ability (MaScore) – the high school mathematics examination score – has a positive and significant effect ($\beta = 0.361$, $p < 0.001$), confirming the important role of foundational knowledge for success in higher education. The gender variable is only marginally significant at the 10% level ($\beta = 0.199$, $p < 0.1$), indicating a slight difference between male and female students (female students tend to have higher scores than male students).

Regarding the moderating role, self-study time (study_time) – the group studying 2–4 hours per day – has a direct positive effect on course grades ($\beta = 0.173$, $p < 0.01$). More importantly, the interaction term between Gf and study_time is negative and statistically significant ($\beta = -0.271$, $p < 0.01$). This finding indicates that for students who self-study 2–4 hours per day, the positive influence of goal orientation on academic performance is significantly weaker compared to those who study less. In other words, when students already invest sufficient self-study time (2–4 hours per day), the advantage derived from goal orientation becomes less important – a finding that supports Hypothesis H2 regarding the negative moderating effect.

Although the model explains only 14.9% of the variance in foundational course grades ($R^2 = 0.149$), this level is consistent with empirical studies in education, where individual academic performance is influenced by many complex factors beyond motivation and self-study time (Richardson et al., 2012c). Moreover, the primary aim of this study is to test the moderating role of self-study time on the relationship between goal orientation and academic performance, not to build an optimal predictive model. The regression coefficients for the focal variables (Ef, Gf, and the interaction term) are all statistically significant and theoretically consistent, confirming the value of the main findings.

V. DISCUSSION

5.1. Effects of goal orientation and expectancy for success

The results show that both expectancy for success (Ef) and goal orientation (Gf) have positive and statistically significant effects on foundational course performance. These findings are fully consistent with expectancy-value theory (Eccles & Wigfield, 2002) and goal orientation theory (Elliot & McGregor, 2001), confirming that students who have stronger beliefs in their ability to complete tasks and clearer orientation toward competence development achieve higher academic outcomes.

The meta-analysis by (Richardson et al., 2012d) demonstrated that motivational factors such as academic self-efficacy and grade goals have a moderate positive correlation with university students' grade point averages. Our results not only reinforce these findings in the context of Vietnamese higher education but also show that the effect of

goal orientation is stronger than that of expectancy for success. This suggests that setting clear learning goals (e.g., striving for deep understanding, aiming to master knowledge) may play a particularly important role for students in economics and business disciplines, where competitive pressure and career orientation may make specific goals more salient than general beliefs about one's own ability.

5.2. Negative moderating effect

One of the most important findings of this study is the negative moderating effect of self-study time on the relationship between goal orientation and academic performance. Specifically, for students who self-study 2–4 hours per day, the positive influence of goal orientation on grades is significantly weaker than for those who study less. We term this the "self-study paradox".

Two mechanisms may explain this effect. First, when students study little, goal orientation compensates for the lack of study behavior. Students with a clear orientation tend to use their scarce time more efficiently, focusing on important content. Conversely, when students already invest sufficient self-study time, study behavior is already assured, making goal orientation less important – a possible ceiling or substitution effect. This result is partly explained by the finding of (Senko et al., 2013), who showed that mastery-oriented students strategically allocate study time to interesting content while avoiding more tedious topics. This implies that once they have a clear "action plan", they can achieve their goals with less time, rather than needing many hours of mere study.

Second, an alternative explanation is that students who self-study extensively often have strong intrinsic motivation; they learn because of enjoyment or the intrinsic value of knowledge, rather than because of performance goals measured by conventional goal orientation scales. Consequently, the effect of goal orientation becomes weaker in this group. This explanation aligns with the empirical study by (Theobald, 2024), who found that when students use better study strategies (planning, monitoring, focusing, and reducing procrastination), they need less self-study time to achieve the same level of daily goal attainment. In other words, it is the quality of self-study strategies, not the amount of time, that is the key determinant of performance; and when that quality is sufficiently high, the effect of goal orientation diminishes.

This finding suggests that encouraging students to spend more time on self-study is necessary, but one should not expect it to further amplify the benefits of goal orientation. Instead, for students who already study sufficiently, interventions should focus on improving the quality of self-study (strategies, methods) rather than further strengthening goal orientation, because these strategies can compensate for deficits in both time and motivation.

5.3. Limitation

Although the study has produced meaningful results, several limitations should be acknowledged. First, the explanatory power of the model (R^2) remains modest. This indicates that many other important factors have not been included in the model, such as teaching quality, support from family and the institution, learning environment, study methods, as well as other psychosocial factors (anxiety, stress). Nevertheless, this level of explained variance is comparable to or higher than that reported in some meta-analyses in the field of education, and is therefore considered acceptable.

Second, the representativeness of the sample. The study was conducted at only one public university in the economics and business sector in Vietnam; thus, the results may not be generalizable to all Vietnamese university students (e.g., students in technical fields, medicine and pharmacy, or at private institutions). Although many studies are also limited to a single university, extending the survey to multiple institutions would enhance the reliability and applicability of the findings.

However, these limitations do not diminish the value of the main findings, particularly the negative moderating effect of self-study time – a result that suggests several educational policy implications. Future research should address these limitations by employing longitudinal designs, more diverse samples, and more objective measures of self-study time.

VI. Conclusions and Recommendations

This study aimed to examine the effects of motivational factors (expectancy for success, task value, and goal orientation) on foundational course performance, as well as to assess the moderating role of self-study time. The results show that goal orientation and expectancy for success have positive effects on grades, while task value is not statistically significant. More importantly, self-study time of 2–4 hours per day weakens the influence of goal orientation on academic performance – a "paradoxical" effect indicating that when self-study behavior is sufficient, the advantage of goal orientation becomes less important.

Based on this finding, we propose three pedagogical recommendations. First, for students with limited self-study time (less than 2 hours per day), instructors should strengthen goal orientation by assigning clear tasks, fostering motivation, and connecting knowledge to practical applications. Second, for students who already study sufficiently (2–4 hours per day), continuing to focus on goal orientation may not yield additional benefits; instead, support should be provided to improve the quality of self-study through effective learning strategies (planning, self-testing, systematic note-taking). Third, universities should encourage students to maintain a reasonable amount of self-study time (approximately 2–4 hours per day), as this factor has a direct positive impact on grades regardless of the level of goal orientation.

Finally, this study has several limitations, including a low R^2 and a sample that is not fully representative. Future research directions include expanding the survey to multiple institutions, adding environmental variables such as family support, teaching quality, and learning culture, and combining qualitative methods to gain deeper insights into the interaction mechanisms between motivation and self-study behavior in the context of Vietnamese higher education.

Disclosure

Declaration of AI Assistance in Language Editing: The authors used DeepSeek to improve language clarity and correct minor errors in grammar and style. They reviewed all

suggestions and are fully responsible for the content of this publication.

Conflicts of Interest

The authors declare no conflicts of interest.

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