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Supporting Student Success in Higher Education: Evidence from a Learning-Centered Bursary Program

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Abstract

This study examines the effectiveness of a learning-centered bursary in supporting academic improvement among economically disadvantaged higher education students. Using administrative and survey data from a private university (N = 357), the study analyzed learning attitudes, behavioral adjustments, and academic outcomes among bursary recipients. Mediation analyses tested whether changes in study time or part-time work explained bursary effects, moderation analysis examined self-regulated learning across academic years, and latent profile analysis identified engagement-based subgroups. Results show that bursary receipt was associated with academic improvement, but this relationship was not mediated by increased study time or reduced employment. Self-regulated learning emerged as a key moderator, with the strongest effects observed among third-year students. A three-profile solution revealed high, moderate, and low engagement groups, but profile membership did not significantly predict academic improvement after adjustment, suggesting a ceiling effect. Overall, findings highlight the importance of learning strategies and developmental stage in maximizing bursary effectiveness.

Keywords: Bursary programs; academic performance; self-regulated learning (SRL); mediation and moderation; latent profile analysis (LPA).

Introduction

Equal access to learning opportunities and equitable participation in higher education are fundamental components of a fair and forward-looking society (Marginson et al., 2025). Higher education is often considered a key driver of social mobility and national development, equipping individuals with the skills, knowledge, and capabilities needed to thrive in an increasingly complex and globalized world. However, despite efforts to expand access and promote inclusion, persistent structural inequalities continue to shape who enters, succeeds, and graduates from university (Woldegiorgis & Chiramba, 2025).

Socioeconomic background remains one of the strongest predictors of academic performance and degree completion in higher education (Moradi Abbasabady & Razeghi, 2025). Students from lower-income households face compounded barriers that extend far beyond tuition fees. Financial hardship often undermines their ability to maintain focus, manage time effectively, and participate fully in university life (Peer, 2024). While students from affluent backgrounds may concentrate solely on their studies, many economically disadvantaged students must balance academic commitments with part-time employment to support themselves or their families (Ramlan et al., 2025). In addition to employment demands, economically disadvantaged students may also face additional constraints such as family caregiving responsibilities or longer commuting distances when living off campus. These factors can further limit available study time and reduce participation in campus-based learning

opportunities. This time poverty can erode opportunities for study; reduce class attendance; and limit participation in academic enrichment programs, such as tutoring, peer learning, or extracurricular activities.

In extreme cases, the psychological and emotional strain caused by prolonged financial pressure may result in academic disengagement or even withdrawal from university (Gonzalez et al., 2025). The constant negotiation between basic survival and academic demands creates a structural disadvantage that is at odds with the ideal of meritocracy. Students with limited economic resources often have to make educational compromises cutting back on study time, missing deadlines, or forgoing collaborative opportunities not due to a lack of ability but due to unequal conditions (Halabieh et al., 2022). This invisible hierarchy within educational systems contradicts the egalitarian goals of higher education and produces lasting effects not only on academic outcomes but also on long-term opportunities for employment, personal development, and self-efficacy (Van Canegem et al., 2024).

In response, bursaries have become a critical policy tool for promoting equity and reducing attrition among disadvantaged students. Unlike loans, bursaries are non-repayable forms of financial assistance awarded based on financial need, academic merit, or both (Todman, 2024). Bursaries are intended to reduce the financial stress that impedes students' academic participation and progress (Hun, 2025). By lessening the need for part-time employment, bursaries can potentially free up time for academic study, self-regulated learning (SRL), and co-curricular engagement. They may also improve students' psychological security and intrinsic motivation by reinforcing a sense of belonging, recognition, and capability (Javaid et al., 2024; Morales et al., 2025).

Recent research shows that the relationship between financial aid and academic success is not linear. While bursaries reduce financial barriers, students differ in their ability to convert aid into academic gains (Brint, 2022). Factors such as SRL capacity, academic motivation, and year level shape the effectiveness of financial support (Hemmler & Ifenthaler, 2024). Students with stronger SRL skills are more likely to translate reduced stress and greater flexibility into improved performance (Ramos-Galarza et al., 2025), consistent with SRL theory (Hadwin et al., 2025; Zimmerman, 2002). SRL also develops across academic stages, with students in later years often better positioned to benefit from support (Alam & Mohanty, 2024).

Moreover, students are heterogeneous in motivation and engagement. Latent profile analysis (LPA) highlights distinct learner subgroups with differing academic needs (Bouckenooghe et al., 2025; Smith et al., 2025). Despite growing interest in financial aid, few studies integrate behavioral, motivational, and structural factors or examine non-Western contexts, underscoring the need for research in diverse educational systems, particularly in Asia. This study addresses these gaps by examining the impact of a learning-centered bursary program at a private university in Taiwan. It investigates whether bursary receipt is associated with improved academic performance, whether this effect is mediated by changes in study time or reduced part-time work, whether SRL moderates the bursary's effect across academic year levels, and whether students with different SRL-related profiles experience bursary support differently.

This paper contributes to higher education literature in several ways. First, it provides one of the earliest empirical examinations of a learning-centered bursary program in East Asia, using institutional data from a private university in Taiwan. Second, it advances financial aid research by moving beyond outcome-focused models to examine behavioral mechanisms and developmental moderators, including SRL across year levels. Third, the findings show that traditional time-based mediators do not fully explain bursary effectiveness, underscoring the importance of learning quality, motivation, and self-regulation. Fourth, the use of LPA highlights heterogeneity in students' learning attitudes and challenges the assumption that high motivation alone leads to better academic outcomes. Finally, the study offers evidence-based implications for designing bursary programs that align with students' developmental stages and learning behaviors.

Literature Review and Hypotheses

Over the past few years, a growing body of research has emphasized that financial aid can support student achievement, not only by reducing financial strain but by enabling deeper academic engagement, particularly when the aid is designed with learning behaviors in mind (Chiu & Chen, 2023; Heo, 2023; LaSota et al., 2025). Learning-centered bursaries, unlike traditional bursaries, are often coupled with structured support or expectations, and thus may influence both the quantity and quality of student academic investment. One central mechanism through which such bursaries operate is time reallocation. Classic student engagement theories, such as Astin's (1997) involvement model, argue that students learn more when they invest more time in meaningful academic activities. Empirically, recent studies have found that reducing part-time work

through financial aid modestly increases academic focus, but the effects depend on how that time is used (Francis et al., 2025; Ladd, 2022). Thus, any effective aid model must also account for students' self-management and learning strategies.

Additionally, SRL theory (Zimmerman, 2002) posits that students' ability to set goals, manage time, and monitor their learning directly influences academic outcomes. SRL may act both as a predictor of success and a moderator that enhances the effectiveness of learning supports like bursaries (Credé & Kuncel, 2008). Recent evidence confirms this interaction: Cleary et al. (2022) found that SRL training enhanced the effectiveness of performance-based financial incentives in college populations. However, SRL is not static; it develops across the student life cycle. Developmental models suggest that the effects of academic supports may be strongest early in college, when students are still building learning strategies and identities (Chickering & Reisser, 1993; Deng et al., 2022). A recent study by Axford and Berry (2023) showed that financial interventions delivered in the first two years of college had significantly larger effects on retention and grade point average (GPA) compared to those introduced later.

Beyond individual characteristics, students vary in motivation and learning attitudes. LPA has been used to uncover distinct subgroups (e.g., mastery-oriented vs. avoidant learners) that predict academic outcomes and responsiveness to interventions (Yun et al., 2025). Understanding these profiles helps explain heterogeneous treatment effects and can guide more personalized policy design. Informed by this literature, the current study evaluates the academic effects of a learning-centered bursary at a private university and examines whether those effects are mediated by time use, moderated by learning self-regulation and grade level, and differentiated by motivational profiles.

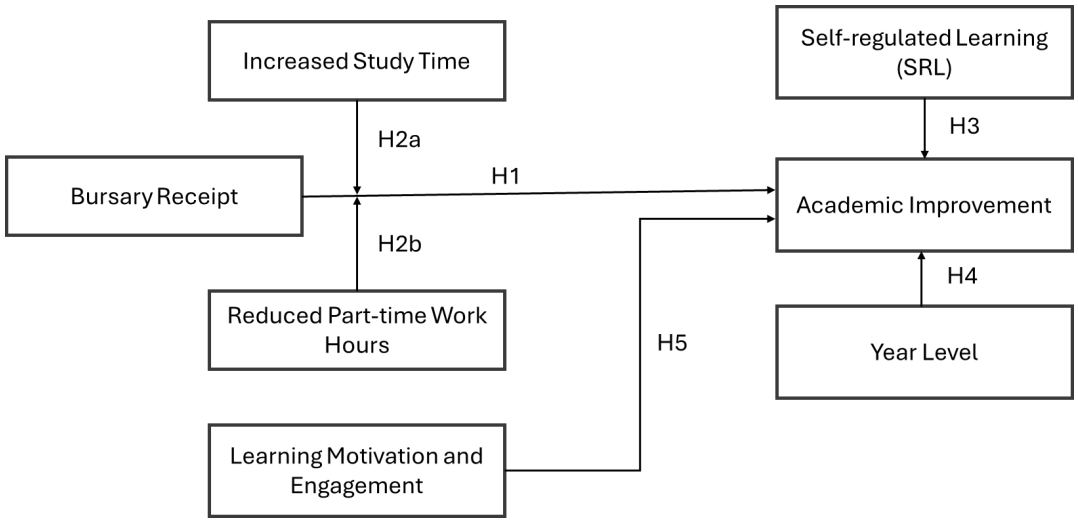
Based on this foundation, the following hypotheses are proposed:

- *H1:* Students who receive the learning-centered bursary will demonstrate greater academic improvement.
- *H2a:* The relationship between bursary receipt and academic improvement will be mediated by increased study time.
- *H2b:* The relationship between bursary receipt and academic improvement will be mediated by reduced part-time work hours.
- *H3:* Self-regulated learning will moderate the effect of bursary receipt on academic improvement.
- *H4:* The effect of the bursary on academic improvement will vary by year level.
- *H5:* Latent profiles with higher motivation and engagement will show greater academic gains.

Figure 1 presents the hypothesized effects of a learning-centered bursary on academic improvement. The model includes two mediators: increased study time and reduced part-time work hours, which explain indirect effects of bursary receipt. SRL and year level are proposed as moderators of the bursary's impact. In addition, learning motivation and engagement profiles are expected to directly predict academic improvement.

Figure 1

Conceptual Model of Hypothesized Relationships



Methodology

Dataset Descriptions

This study used institutional academic records and learning diagnostic data collected during the 2023–2024 academic year at a private university in Taiwan. The sample included 364 undergraduate students eligible for or receiving a learning-centered bursary. Data comprised anonymized responses to institutional questionnaires assessing learning motivation and engagement, collected at the end of the academic term with informed consent. The questionnaire was administered as part of the university's bursary program evaluation process, and students completed it when participating in the program. This procedure resulted in a high response rate among bursary recipients.

Key variables included bursary receipt, GPA improvement, weekly study hours, part-time work status, SRL indicators, and academic year. Students represented diverse disciplines, including business, engineering, and social sciences. All data were anonymized by the Office of Academic Affairs, and the secondary analysis was approved through the university's internal research oversight process. After data screening, seven invalid records were excluded, yielding a final analytic sample of 357 students. Eligibility for the learning-centered bursary was determined annually based on a combination of financial need and academic participation requirements defined by the university. This program includes various measures, such as improving the guidance mechanism for learning and enhancing employability, as part of the higher education support plan. Under this program, college students from families whose income falls within the bottom 40% of households in Taiwan can receive government or university grants to support their studies. Students are required to submit an application and demonstrate engagement in learning-related activities supported by the program. Because eligibility is evaluated each academic year, some students, particularly those in later years of study, may have received bursary support in earlier semesters.

Measures and Variables

Academic Improvement (Outcome): GPA records were used to construct a binary outcome variable: 1 = GPA improvement from the prior semester, 0 = no improvement or a decline. The threshold was defined as any positive change in GPA. A binary indicator was used because institutional evaluation of bursary effectiveness focuses on whether students demonstrate measurable academic progress between semesters. This approach also facilitates comparison across departments with different grading distributions.

Bursary Receipt (Independent Variable): A dichotomous variable indicating bursary status: 1 = received the learning-centered bursary, 0 = non-recipient.

Study Time and Part-Time Work (Mediators): Weekly study time was self-reported via ordinal categories (e.g., "10 hours or less," "11–19 hours") and recoded using midpoints for analysis. Part-time work change was coded as 1 = reduced work hours due to the bursary, 0 = no reduction. Students with no part-time jobs were excluded from related analyses.

Self-Regulated Learning: SRL was assessed via seven 5-point Likert-scale items from an institutional questionnaire. Items captured curiosity, academic initiative, motivation, problem solving, and teamwork. Exploratory factor analysis (EFA) identified a core 5-item Self-Regulated Academic Engagement factor, used in regression and moderation models. Internal consistency was high (KMO = 0.87, Bartlett's test $p < 0.001$).

Academic Year (Moderator): Categorical variable representing student year level (1st through 4th), used to explore developmental effects in moderation analysis.

Latent Profiles (Exploratory Grouping): The seven SRL-related items were used in an LPA to classify students into motivational subgroups. Profile membership was then used to predict academic improvement.

Construct Validation via Factor Analysis

To validate the SRL construct, an EFA was conducted using principal axis factoring with oblique rotation on the seven Likert-scale items. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.87, and Bartlett's test of sphericity was significant ($\chi^2 = 4182.94$, $df = 21$, $p < .001$), indicating suitability for factor analysis. Two factors were extracted as shown in Table 1.

Table 1

Factor Loadings for Self-Regulated Academic Engagement Items

Item	Factor 1: Learning Engagement	Factor 2: Teamwork
I am curious and eager to explore.	**0.803**	0.135
I actively improve the knowledge needed for my career.	**0.805**	0.172
I am willing to take initiative in learning.	**0.804**	0.128
I actively face problems when they arise.	**0.821**	0.189
I evaluate the strengths and weaknesses of different solutions.	**0.817**	0.114
I actively contribute to team development.	0.008	**0.887**
I am willing to share responsibility and solve problems with teammates.	0.014	**0.890**

Factor 1: Self-Regulated Academic Engagement — included five items related to curiosity, career-motivated learning, proactive effort, problem solving, and critical evaluation. All loadings exceeded 0.80, confirming internal coherence.

Factor 2: Teamwork Orientation — comprised two items concerning group collaboration and shared responsibility, with loadings above 0.88.

Due to its strong alignment with SRL theory (Zimmerman, 2002), we retained only Factor 1 for primary analysis. A composite score was computed by averaging the standardized values of the five learning engagement items. Internal consistency reliability for this factor was excellent (Cronbach's $\alpha = 0.91$), supporting the scale's construct validity (Nunnally & Bernstein, 1994). The teamwork factor was excluded from hypothesis testing but may be examined in future exploratory work.

Analytical Approach

The analytical methods were selected to align with the study's research hypotheses and the structure of the available data. The analytical strategy proceeded in four stages. First, logistic regression was used to estimate the direct association between bursary receipt and academic improvement (H1). Second, mediation analyses tested whether increased study time and reduced part-time work explained the relationship between bursary receipt and academic improvement (H2a–H2b). Third, moderation analyses examined whether SRL and academic year level conditioned the effect of bursary receipt on academic improvement (H3–H4). Finally, LPA was conducted to identify heterogeneous engagement profiles and assess whether these profiles predicted academic improvement (H5).

Factor Analysis: Principal axis factoring with oblique rotation was used to confirm the factor structure of the SRL scale. A two-factor solution was retained based on eigenvalues and interpretability.

Mediation and Moderation Analyses: These analyses were conducted using ordinary least squares (OLS) and logistic regression. Mediation paths tested whether study time and reduced part-time work explained the relationship between bursary receipt and academic improvement. Bootstrapped standard errors with 1,000 resamples were used to estimate indirect effects. Moderation analysis tested the interaction between SRL and academic year.

Latent Profile Analysis: Motivational subtypes were identified via LPA using Mplus (Version 8) with maximum likelihood robust (MLR) estimation. Model fit was evaluated using Bayesian information criterion (BIC), Akaike information criterion (AIC), and entropy values, and a five-profile solution was retained. Profiles were labeled based on students' average response patterns across SRL indicators, distinguishing subgroups with high academic engagement, moderate motivation, and limited collaborative orientation. Logistic regression was subsequently used to examine whether profile membership predicted academic improvement.

Results

Demographic Analysis

Table 2 presents the distribution of bursary recipients by academic year. Among the 357 valid records, first-year students constituted the largest group (36.7%), followed by second-year students (31.4%), third-year students (20.7%), and fourth-year students (11.2%). Overall, lower-year students accounted for 68.1% of the sample, exceeding the proportion of upper-year students. This pattern likely reflects differences in academic structures and time commitments across stages of study. Upper-year students are more likely to be engaged in mandatory internships or sustained part-time employment, which may affect both their availability and perceived need for bursary support. In contrast, lower-year students generally face fewer structural constraints, potentially allowing greater flexibility in their study-related behaviors.

This grade-level distribution provided important context for the subsequent moderation analyses. Notably, fourth-year students represented a relatively small proportion of the sample (n = 40, 11.2%), which limited statistical power for year-specific estimates. Consequently, findings involving fourth-year students were interpreted with caution and treated as exploratory. This underrepresentation is substantively justified, as many fourth-year students are engaged in off-campus internships or mandatory field courses, reducing their likelihood of applying for the bursary. This academic structure provides a plausible explanation for the lower participation rate observed in this year group.

Table 2

Bursary Recipient Demographics by Grade Level

Grade Level	Count	Percentage (%)
First Year	131	36.7
Second Year	112	31.4
Third Year	74	20.7
Fourth Year	40	11.2
Total	357	100.0

Direct Effect of Bursary Receipt on Academic Improvement (H1)

Logistic regression analysis was employed to estimate the direct association between bursary receipt and academic improvement. Academic improvement (GPA increase vs. no improvement) was modeled as the dependent variable, with bursary participation specified as the primary predictor. As shown in Table 3, bursary receipt was positively and significantly associated with academic improvement (B = 0.42, p = 0.027), with an odds ratio of 1.52 (95% CI [1.05, 2.20]). This indicates that students receiving the bursary were approximately 52% more likely to experience GPA improvement than those without bursary support. Based on this statistically significant association, Hypothesis 1 is considered supported.

Table 3

Logistic Regression Predicting Academic Improvement

Predictor	B	SE	z	p	OR	95% CI
Bursary receipt	0.42	0.19	2.21	0.027	1.52	[1.05, 2.20]
Constant	-0.18	0.20	-0.90	0.37	—	—

Note. OR = Odds Ratio

Mediation Analysis (H2a–H2b)

To examine potential mechanisms through which financial support may enhance academic performance, mediation analysis was conducted to test whether the effect of reduced part-time work on academic improvement operated through increased weekly study time. Academic improvement was coded as a binary outcome, with study time increase specified as an ordinal mediator. SRL, career-oriented motivation, collaborative competence, and grade level were included as control variables. As

shown in Table 4, reduced part-time work was positively but not significantly associated with increased study time (B = 0.098, p = 0.142), and none of the learning-related controls significantly predicted study time changes. As shown in Table 5, none of the proposed mediators or learning-related covariates significantly predicted academic improvement. Reduced part-time work (OR = 1.06, p = 0.757) and increased study time (OR = 0.92, p = 0.528) did not show statistically significant associations with the likelihood of GPA improvement. Similarly, SRL, career motivation, and collaborative attitude did not exert significant direct effects, with all confidence intervals including unity. Overall, these results indicate that the mediation pathways through which bursary support might influence academic improvement are not supported in the present sample. The findings suggest that the relationship may not primarily operate through time reallocation or learning-related self-reports, and alternative mechanisms may underline observed performance gains.

Table 4

Path a (OLS): Predicting Study Time Increase

Variable	B	SE	t	p
Reduced Part-Time Work	0.098	0.067	1.473	0.142
Self-Regulated Learning Score	-0.005	0.108	-0.047	0.963
Career Motivation	0.109	0.086	1.274	0.203
Collaborative Attitude	0.097	0.087	1.123	0.262

Table 5

Path b/c (Logistic): Predicting Academic Improvement

Predictor	B	SE	z	p	OR	95% CI (OR)
Reduced part-time work	0.061	0.196	0.31	0.757	1.06	[0.72, 1.56]
Study time increase	-0.086	0.136	−0.63	0.528	0.92	[0.70, 1.20]
Self-regulated learning	0.016	0.314	0.05	0.959	1.02	[0.55, 1.88]
Career motivation	-0.193	0.250	−0.77	0.441	0.83	[0.51, 1.35]
Collaborative attitude	-0.014	0.253	−0.06	0.956	0.99	[0.60, 1.62]

Moderation Analysis (H3–H4)

Moderation analyses examined whether grade level moderates the relationship between SRL and academic improvement. Logistic regression results (Table 6) showed a significant interaction for third-year students (B = 1.343, OR = 3.83, p = 0.016), indicating that the effect of SRL may vary across academic stages. No significant interactions were found for other year levels. Simple slope analyses (Table 7) showed that higher SRL was strongly associated with academic improvement among third-year students (OR ≈ 2.23), while associations were weak or unstable for other groups. These findings indicate that the relationship between learning behaviors and academic outcomes differs by academic year, suggesting that the effectiveness of bursary support may depend on students' developmental stage within the university experience. Therefore, Hypothesis 4, which proposes that the effect of the bursary on academic improvement varies by year level, is considered supported. These findings should be interpreted as exploratory, suggesting that SRL may have the greatest impact at later stages of study.

Table 6

Moderation: Interaction of Self-Regulated Learning × Grade Level

Predictor	B	SE	z	p	OR	95% CI (OR)
SRL (Year 1 reference)	-0.540	0.532	-1.02	0.310	0.58	[0.21, 1.65]
SRL × Year 2	0.389	0.541	0.72	0.472	1.48	[0.51, 4.27]
SRL × Year 3	**1.343**	**0.557**	**2.41**	**0.016**	**3.83**	**[1.29, 11.41]**
SRL × Year 4	1.293	1.321	0.98	0.327	3.65	[0.27, 48.54]

Table 7

Simple Slopes of Self-Regulated Learning by Grade Level

Grade level	Slope (log-odds)	Odds ratio
1	-0.540	0.583
2	-0.151	0.860
3	0.802	2.231
4	0.753	2.124

Latent Profile Analysis and Outcome Prediction (H5)

Table 8 summarizes the three latent engagement profiles derived from SRL indicators. The high-engagement profile (n = 162) was characterized by near-ceiling scores across all learning dimensions, including curiosity, active learning, problem solving, and shared responsibility. Despite this uniformly strong engagement pattern, this group showed the lowest proportion of academic improvement (36%), which may reflect diminishing returns when learning behaviors are already maximized. The moderate-engagement profile (n = 168) displayed consistently high but non-ceiling scores across learning indicators, particularly in collaborative contribution and shared responsibility. This group exhibited the highest likelihood of academic improvement (48%), suggesting that balanced and strategically applied learning engagement may be more conducive to performance gains than uniformly maximal engagement.

The low-engagement profile (n = 27) showed comparatively lower scores across all learning dimensions, alongside the lowest likelihood of reduced part-time work. Despite these disadvantages, the rate of academic improvement in this group (44%) was not markedly lower than that of the high-engagement group. This suggests that factors other than SRL engagement such as structural constraints or motivational shifts may play a role in shaping outcomes for these students. Given the small sample for this profile, these findings should therefore be interpreted cautiously.

Table 9 presents adjusted logistic regression results predicting academic improvement from profile membership. After controlling study time increase and reduced part-time work, neither the moderate- nor low-engagement profiles differed significantly from the high-engagement profile. Notably, increased study time was negatively associated with academic improvement, reinforcing the interpretation that learning quality and strategic engagement, rather than time investment alone, drive academic gains.

Table 8

Profile Means (Original 1–5 Scale for Items)

Variable	High Engagement (n = 162)	Moderate Engagement (n = 168)	Low Engagement (n = 27)
Curiosity	4.95	4.25	3.67
Career knowledge growth	5.00	4.37	3.74
Active learning	5.00	4.32	3.67
Problem solving	5.00	4.39	3.26
Evaluate solutions	5.00	4.12	3.33
Team contribution	5.00	4.47	3.44
Shared responsibility	5.00	4.44	3.78
Study time increase (0–4)	1.57	1.47	1.33
Reduced part-time work (0/1)	0.49	0.45	0.15
Academic improvement (0/1)	0.36	0.48	0.44

Table 9

Logistic Regression: Predicting Improvement From Profiles (Adjusted)

Predictor	B	SE	z	p	OR	95% CI (OR)
Moderate vs. High Engagement	0.20	0.39	0.50	0.616	1.22	[0.56, 2.63]
Low vs. High Engagement	−0.14	0.34	−0.41	0.685	0.87	[0.44, 1.71]
Study time increase (0–4)	−0.35	0.17	−2.07	0.038	0.70	[0.50, 0.98]
Reduced part-time work (0/1)	0.15	0.23	0.63	0.527	1.16	[0.74, 1.82]

To consolidate the findings from the mediation, moderation, and latent profile analyses, Table 10 presents a summary of the hypothesis testing results. It indicates whether each hypothesized relationship was supported, partially supported, or not supported based on the data.

Table 10

Hypothesis Evaluation: Effects of Bursary Support on Academic Improvement

Hypothesis	Description	Conclusion
H1	Students who receive the learning-centered bursary will demonstrate greater academic improvement.	Supported
H2a	The relationship between bursary receipt and academic improvement will be mediated by increased study time.	Not supported
H2b	The relationship between bursary receipt and academic improvement will be mediated by reduced part-time work hours.	Not supported
H3	SRL will moderate the effect of bursary receipt on academic improvement.	Exploratory support (significant among third-year students only)
H4	The effect of the bursary on academic improvement will vary by year level.	Supported (strongest interaction observed among third-year students)
H5	Latent profiles with higher motivation and engagement will show greater academic gains.	Not supported

Note. Conclusions are based on adjusted models. Findings related to year-level subgroups should be interpreted as exploratory due to sample size considerations.

Discussion

The primary aim of this study was to evaluate whether participation in a learning-centered bursary program contributes to academic improvement among economically disadvantaged students. Using an analytic sample of 357 students, bursary receipt was positively associated with academic gains; however, the mechanisms through which these gains occur remain unclear. Specifically, increased study time and reduced part-time work did not appear to mediate the bursary's effects, suggesting that financial relief alone may not automatically translate into improved performance (Clotfelter et al., 2018). Instead, SRL and developmental stage emerged as potential moderators, with the strongest associations observed among third-year students. While fourth-year students constituted a smaller subgroup (n = 40), limiting precision at this stage, the third-year findings provided relatively stable evidence that students benefit most from academic support when effective learning strategies and metacognitive skills are in place (Hey et al., 2024; Shen & Bai, 2024). It is also possible that program-related factors may partially influence this relationship. For example, bursary eligibility requirements, application procedures, or institutional expectations associated with the program may attract students who are already more academically motivated or engaged. Such selection dynamics could contribute to the observed interaction between SRL and academic year. Future research should examine program design features and eligibility criteria more closely to better distinguish program effects from potential selection mechanisms.

LPA further indicated a potential ceiling effect, as students with uniformly high motivation did not consistently achieve greater academic improvement, highlighting the importance of strategic learning depth over engagement alone (Yip et al., 2025; Zhu et al., 2025). Although the low-engagement profile comprised a smaller subgroup (n = 27), it displayed a pattern of lower

scores across SRL dimensions and the lowest likelihood of reduced part-time work; these findings should be interpreted cautiously. Retaining this profile allowed the analysis to capture meaningful heterogeneity in students' learning engagement and structural constraints. Consistent with meta-analytic evidence on targeted financial aid (Lintner, 2024), the results support the potential value of learning-aligned bursaries but suggest that their effects may not primarily operate through time reallocation (Mulyaningsih et al., 2025). One possible explanation is that financial support reduces financial stress and uncertainty, allowing students to focus more effectively on their academic work. Even when study time does not increase, students may experience improved concentration, motivation, and psychological security, which can enhance the quality of their learning. Financial assistance may also enable students to remain engaged in academic activities without the constant pressure of financial hardship. In this sense, bursaries may work not only by changing how much time students study, but also by improving the conditions under which learning occurs. The findings align with recent evidence indicating that learning strategies, rather than time investment, may contribute to academic improvement (Cristea et al., 2025).

Theoretical Implications

These findings contribute to the broader understanding of how financial aid interacts with psychological and developmental constructs. First, they highlight the potential importance of quality over quantity in academic engagement. The absence of mediation through study time challenges classic engagement theories and supports emerging evidence that strategic engagement matters more than effort duration (Fu et al., 2025). Second, the moderating role of SRL adds nuance to social-cognitive models of learning. A bursary may only unlock academic potential if the student possesses or is trained in self-regulation skills. This supports dual-pathway models where external support (bursary) and internal regulation (SRL) must align to yield improvement (Kitsantas et al., 2025). Third, the observed ceiling effect underscores diminishing returns in intervention effectiveness. Students already demonstrating high engagement may experience less incremental benefit from external support. This suggests a saturation threshold and highlights the need for differential targeting in educational interventions.

Practical Implications

For practice, the results imply that learning-centered bursaries may be most effective when paired with strategic learning support. Institutions should consider integrating SRL coaching, learning contracts, or mentoring into bursary programs to cultivate the skills that make financial aid more actionable. As the gains were strongest for third-year students in this study, early intervention programs may be important to help students leverage financial support as academic demands intensify. In addition, differentiated support should be designed based on student profiles. High-performing students may benefit more from enrichment opportunities (e.g., research assistantships), while those with mid-level motivation and poor strategy use might benefit from skill-building workshops. These personalized approaches are increasingly supported in the literature on student success interventions (Gül & Ayık, 2025; Ortagus et al., 2023).

Policy Recommendations

- Align bursaries with academic development by potentially positioning financial aid as a catalyst for learning, engagement, and achievement rather than solely as economic relief.
- Integrate learning-based conditions by linking bursary receipt to participation in academic support activities, such as study skills training, advising, or self-regulation development, which could enhance impact.
- Adopt tiered and developmentally timed support by adjusting bursary intensity based on students' academic stage, transition points, and readiness for SRL, which may improve outcomes.
- Expand and refine eligibility criteria by incorporating indicators of learning potential, self-regulation capacity, and field-specific excellence alongside traditional academic performance, which could better target support.
- Strengthen cross-unit coordination by fostering collaboration among financial aid offices, academic affairs, and student support services to deliver integrated, student-centered interventions that may enhance effectiveness.
- Enhance transparency, outreach, and accountability by ensuring clear application processes, broad student awareness, and systematic monitoring and evaluation, which could help continuously improve bursary effectiveness.

Conclusion

This study adds to the literature on learning-centered bursary programs by examining potential mechanisms, moderators, and student heterogeneity. Although bursary recipients showed academic improvement in this sample, these gains were not explained by increased study time or reduced employment. SRL emerged as an important moderator, particularly among third-year students, highlighting the potential role of internal learning capacities in translating financial support into academic outcomes. LPA further revealed heterogeneous engagement patterns, suggesting that motivation alone may not be sufficient to guarantee performance gains. Overall, the findings emphasize the importance of aligning financial aid with learning strategy support and students' developmental readiness. The study is limited by its cross-sectional design, reliance on self-reported data, and focus on a single private university in Taiwan. Future research should consider longitudinal and comparative designs across diverse socioeconomic contexts to more robustly assess the long-term and differential effects of bursary programs.

Ethics Statement: All participants provided informed consent by proceeding after reading a statement on the study's purpose, anonymity, and voluntary nature of participation.

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