

# Effects of Growth Mindset Interventions on Academic Performance of Low-Achieving University Students

## Kayunga District, Uganda

Enoch Tumusiime, [enoch.tumusiime.38888@studmc.kiu.ac.ug](mailto:enoch.tumusiime.38888@studmc.kiu.ac.ug)

Basake Julius Alochere, [Julius.basake@kiu.ac.ug](mailto:Julius.basake@kiu.ac.ug)

Asimmwe Specioza Magunda, [specioza.asimwe@kiu.ac.ug](mailto:specioza.asimwe@kiu.ac.ug)

Orcid: <https://Orcid.Org/0009-0007-1672-5806>

Kampala International University

### Abstract

Academic underperformance among low-achieving students in higher education remains a significant challenge, often linked to low self-efficacy, limited learning strategies, and motivational barriers. This study examined the effects of growth mindset interventions on the academic performance of low-achieving university students, aiming to determine whether structured mindset activities could improve measurable outcomes. A quasi-experimental pretest–posttest control group design was employed, involving 120 students divided equally into experimental and control groups. The experimental group participated in an eight-week growth mindset programme consisting of interactive workshops, goal-setting exercises, attribution retraining, peer mentoring, and continuous feedback, while the control group continued with conventional academic activities. Academic performance was assessed using standardized tests and Grade Point Average records, and mindset change was measured using a validated Growth Mindset Questionnaire. Data were analyzed using paired and independent sample t-tests, ANCOVA, multiple regression, and effect size calculations. Results indicated that the experimental group showed substantial improvements in academic performance, with mean test scores increasing from 48.35 to 68.72 and GPA from 2.12 to 3.01, alongside a significant rise in growth mindset scores from 2.85 to 4.12. Statistical analyses confirmed these gains were significant ( $p < .001$ ) with large effect sizes, and regression results revealed that growth mindset strongly predicted academic performance ( $\beta = 0.62$ ,  $R^2 = 0.384$ ). The study concludes that targeted growth mindset interventions can effectively enhance both academic outcomes and adaptive beliefs among low-achieving students, suggesting that higher education institutions should integrate structured mindset programmes into academic support systems to promote sustained learning and performance improvement.

**Keywords:** *Growth mindset, Academic performance, Low-achieving students, Higher education, Intervention study*

### 1. Introduction

Academic underperformance among students in higher institutions of learning remains a persistent concern globally, particularly among low-achieving students who often struggle to meet minimum academic standards and complete their programmes successfully. This challenge is linked to a combination of cognitive, motivational, and environmental factors, including poor prior preparation, low self-efficacy, and limited academic support systems. Recent studies have shown that many students entering higher education lack the adaptive learning strategies required to cope with increasing academic demands, which often results in poor grades, low retention, and high dropout rates (Xu et al., 2024; Svensen, 2026). In addition, evidence suggests that students' beliefs about their own abilities play a critical role in shaping their academic behaviours and outcomes, particularly in challenging learning environments (Yeager et al., 2019; Chow & To, 2025). These issues highlight the need for effective interventions that go beyond traditional teaching approaches to address the psychological and motivational dimensions of learning.

## Literature and theoretical review

One theoretical framework that has gained considerable attention in addressing academic underperformance is the concept of growth mindset, originally grounded in the work of Carol Dweck. Growth mindset refers to the belief that intelligence and abilities can be developed through effort, persistence, and effective learning strategies, as opposed to a fixed mindset, where individuals view intelligence as static and unchangeable. In recent years, growth mindset has been widely applied in educational settings as a psychological intervention aimed at improving students' motivation, resilience, and academic performance. Empirical evidence suggests that students who adopt a growth mindset are more likely to embrace challenges, persist in the face of setbacks, and achieve better academic outcomes compared to their counterparts with a fixed mindset (Yeager et al., 2019; Fink et al., 2023; Apiku & Asiimwe, 2023). Furthermore, interventions designed to foster growth mindset have been shown to influence students' attitudes towards learning and enhance their adaptability in complex academic environments (Xu et al., 2024; Chow & To, 2025; Magunda & Asiimwe, 2025).

Despite the growing popularity of growth mindset interventions, the empirical evidence regarding their effectiveness on academic performance remains mixed, particularly in higher education contexts. Some studies report positive effects, especially among low-achieving students, where targeted interventions have led to improvements in grade point averages and learning engagement (Fink et al., 2023; Xu et al., 2024; Mokhosi & Asiimwe, 2024). However, other studies have found that while such interventions may successfully change students' beliefs about intelligence, they do not always translate into significant improvements in academic achievement (Curry, 2021; Yeager et al., 2019; Mokhosi & Asiimwe, 2025). This inconsistency suggests that the effectiveness of growth mindset interventions may depend on contextual factors such as implementation quality, duration of intervention, and institutional support systems. It also raises important questions about the conditions under which these interventions can produce meaningful academic gains.

A critical gap in the existing literature is the limited focus on low-achieving students within higher institutions of learning, particularly in developing educational contexts. Many previous studies have either focused on general student populations or secondary school settings, thereby overlooking the unique academic and psychological challenges faced by underperforming university students. Moreover, there is insufficient empirical evidence on how structured and sustained growth mindset interventions can be effectively integrated into higher education systems to improve measurable academic outcomes. Existing studies often emphasize short-term interventions without adequately examining long-term academic performance or the mechanisms through which mindset changes influence learning behaviours (Curry, 2021; Svensen, 2026). This gap limits the generalizability of findings and underscores the need for more rigorous and context-specific research.

In response to these gaps, the present study aims to examine the effects of growth mindset interventions on the academic performance of low-achieving students in higher institutions of learning. Specifically, the study seeks to determine whether structured growth mindset interventions can significantly improve students' academic outcomes, as well as to explore the relationship between mindset change and performance indicators. The study is guided by the following hypotheses: (i) growth mindset interventions have a significant positive effect on the academic performance of low-achieving students, and (ii) students exposed to growth mindset interventions will demonstrate higher academic performance compared to those who are not exposed to such interventions. By addressing these objectives, the study contributes to the growing body of knowledge on educational interventions and provides empirical evidence that can inform policy and practice in higher education.

## 2. Methodology

### 2.1 Research Design

This study adopted a quasi-experimental pretest–posttest control group design to examine the effects of growth mindset interventions on the academic performance of low-achieving students in higher institutions of learning. A quasi-experimental approach was considered appropriate because random assignment of participants to groups was not fully feasible within the institutional setting, yet the design still allowed for causal inference through comparison between intervention and control groups (Creswell & Creswell, 2021).

Two groups were involved:

- i. Experimental group exposed to the growth mindset intervention
- ii. Control group that received no intervention but continued with conventional academic activities

Both groups were assessed before and after the intervention using standardized academic performance measures. This design helps control for baseline differences and allows estimation of treatment effects by comparing changes across groups over time (Schneider et al., 2022).

**Table 1: Research Design Structure**

Group	Pretest	Intervention	Posttest
Experimental	Yes	Growth Mindset Programme	Yes
Control	Yes	No Intervention	Yes

## 2.2 Study Area and Population

The study was conducted in selected higher institutions of learning where academic performance challenges among students have been reported. The target population consisted of undergraduate students identified as low-achieving, defined as students with a Grade Point Average (GPA) below 2.50 on a 5-point scale.

Low-achieving students were specifically selected because prior research shows that mindset-based interventions tend to have stronger effects among academically vulnerable groups (Yeager et al., 2022).

## 2.3 Sample Size and Sampling Technique

A sample size of 120 students was used in this study. The sample was divided equally into:

- i. 60 students in the experimental group
- ii. 60 students in the control group

The sample size was determined using power analysis to ensure sufficient statistical power to detect meaningful differences between groups (Lakens, 2022).

A multi-stage sampling technique was adopted:

1. Purposive sampling to identify institutions with records of low academic performance
2. Screening procedure to identify low-achieving students based on GPA
3. Simple random sampling to assign eligible students into experimental and control groups

This approach ensured both relevance and representativeness of the study sample.

## 2.4 Description of the Growth Mindset Intervention

The intervention was designed based on the theoretical framework of growth mindset, which emphasizes that intelligence and abilities can be developed through effort, persistence, and effective strategies (Dweck, 2021).

### Intervention Duration

The intervention lasted for 8 weeks, with one session per week.

### Mode of Delivery

- i. Face-to-face interactive sessions
- ii. Supplemented with digital learning materials

### Intervention Components

The programme included:

- i. Workshops on brain plasticity and learning processes
- ii. Goal-setting and self-reflection exercises
- iii. Attribution retraining (effort vs ability beliefs)
- iv. Peer discussion and mentoring sessions
- v. Continuous feedback and reinforcement

**Table 2: Structure of the Growth Mindset Intervention**

Week	Topic	Activity Type
1	Introduction to Growth Mindset	Lecture and discussion
2	Brain Plasticity	Multimedia presentation
3	Overcoming Failure	Case studies
4	Effort and Strategy	Group exercises
5	Goal Setting	Practical workshop
6	Self-Regulation	Reflection tasks
7	Peer Learning	Group discussion
8	Review and Reinforcement	Feedback session

### 2.5 Instruments for Data Collection

Multiple instruments were used to capture both academic performance and psychological constructs.

**Academic Performance Test (APT):** A standardized test developed based on course content was used to measure academic achievement before and after the intervention.

**Grade Point Average (GPA) Records:** Official GPA records were collected to provide an objective measure of academic performance.

**Growth Mindset Questionnaire (GMQ):** A structured questionnaire adapted from validated mindset scales was used to assess students' beliefs about intelligence. The GMQ consisted of 10 items rated on a 5-point Likert scale ranging from strongly disagree to strongly agree.

**Table 3: Measurement of Variables**

Variable	Instrument	Scale Type
Academic Performance	APT and GPA	Continuous

Variable	Instrument	Scale Type
Growth Mindset	GMQ	Likert Scale

## 2.6 Validity of Instruments

To ensure content validity, all instruments were reviewed by three experts in educational psychology and measurement. Their feedback was used to refine items for clarity, relevance, and alignment with study objectives.

Construct validity of the Growth Mindset Questionnaire was assessed using factor analysis, confirming that all items loaded appropriately on the intended construct (Hair et al., 2021).

## 2.7 Reliability of Instruments

Reliability of the questionnaire was tested using Cronbach's alpha coefficient.

**Table 4: Reliability Statistics**

Instrument	Cronbach's Alpha
Growth Mindset Questionnaire	0.87

The reliability coefficient of 0.87 indicates high internal consistency, exceeding the recommended threshold of 0.70 for social science research (Taber, 2023).

## 2.8 Data Collection Procedure

Data collection was conducted in three phases:

1. **Pre-intervention phase:** Administration of baseline tests and questionnaires
2. **Intervention phase:** Implementation of the 8-week growth mindset programme
3. **Post-intervention phase:** Re-administration of tests and questionnaires

All ethical considerations, including informed consent and confidentiality, were strictly observed.

## 2.9 Data Analysis Methods

Data analysis was carried out using statistical software such as IBM SPSS 27.

**Descriptive Statistics:** Mean, standard deviation and frequency distributions

### Inferential Statistics

1. **Paired Sample t-test:** To compare pretest and posttest scores within groups
2. **Independent Sample t-test:** To compare experimental and control groups
3. **Analysis of Covariance (ANCOVA):** To control for baseline differences
4. **Multiple Regression Analysis:** To examine the relationship between mindset and performance

### 5. Effect Size (Cohen's d): To measure magnitude of intervention impact

These techniques are widely recommended for intervention studies in education (Field, 2022).

#### 2.10 Model Specification

The relationship between growth mindset intervention and academic performance was expressed as:

$$Y = \beta_0 + \beta_1 X + \epsilon \quad (1)$$

where:

$Y$  = Academic performance

$X$  = Growth mindset intervention

$\beta_0$  = Intercept

$\beta_1$  = Effect of intervention

$\epsilon$  = Error term

#### 2.11 Ethical Considerations

Ethical approval was obtained from the relevant institutional review board. Participation was voluntary, and students were informed of their right to withdraw at any stage. Confidentiality and anonymity were maintained throughout the study.

### 3. Results

This section presents the findings obtained from the analysis of data collected from both the experimental and control groups. The results are organized into descriptive statistics and inferential statistics, including paired sample t tests, independent sample t tests, analysis of covariance, and regression analysis. Effect sizes are also reported to indicate the magnitude of observed differences.

#### 3.1 Descriptive Statistics

Descriptive statistics were computed to summarize the characteristics of the data, including mean scores and standard deviations for academic performance and growth mindset measures across pretest and posttest periods.

##### Academic Performance (APT Scores)

Table 5 presents the descriptive statistics for academic performance scores for both groups at pretest and posttest.

**Table 5: Descriptive Statistics for Academic Performance Scores (APT)**

Group	Test Phase	N	Mean	Standard Deviation
Experimental	Pretest	60	48.35	6.42
Experimental	Posttest	60	68.72	7.15
Control	Pretest	60	47.91	6.58
Control	Posttest	60	52.10	6.73

The results in Table 5 show that both groups started with nearly the same level of academic performance at pretest, with mean scores of 48.35 for the experimental group and 47.91 for the control group. After the intervention period, the experimental group recorded a substantial increase in mean score to 68.72, whereas the control group showed only a slight improvement to 52.10. This pattern indicates that the change in academic performance was much greater in the experimental group compared to the control group over the same period.

### Grade Point Average (GPA)

Descriptive statistics for GPA scores are presented in Table 6.

**Table 6: Descriptive Statistics for GPA Scores**

Group	Test Phase	N	Mean GPA	Standard Deviation
Experimental	Pretest	60	2.12	0.31
Experimental	Posttest	60	3.01	0.40
Control	Pretest	60	2.10	0.29
Control	Posttest	60	2.32	0.33

The results in Table 6 show that both groups started with similar mean GPA scores at pretest, indicating comparable baseline academic performance. At posttest, the experimental group recorded a substantial increase in mean GPA, while the control group showed only a modest improvement. The standard deviations suggest a slight increase in score variability in the experimental group after the intervention, whereas variability in the control group remained relatively stable.

### Growth Mindset Scores

Table 7 presents the descriptive statistics for growth mindset scores measured using the Growth Mindset Questionnaire.

**Table 7: Descriptive Statistics for Growth Mindset Scores**

Group	Test Phase	N	Mean	Standard Deviation
Experimental	Pretest	60	2.85	0.52
Experimental	Posttest	60	4.12	0.47
Control	Pretest	60	2.83	0.50
Control	Posttest	60	2.95	0.51

The results in Table 7 above show that the experimental group experienced a substantial increase in growth mindset scores from pretest to posttest, rising from a mean of 2.85 to 4.12. In contrast, the control group showed only a slight increase from 2.83 to 2.95, indicating minimal change over the same period. This pattern suggests that the growth mindset intervention was associated with a notable improvement in students' mindset compared to those who did not receive the intervention.

### 3.2 Paired Sample t Test Results

Paired sample t tests were conducted to compare pretest and posttest scores within each group.

### Experimental Group

**Table 8: Paired Sample t Test for Experimental Group (Pretest vs Posttest)**

Variable	Mean Difference	t	df	p value	Cohen's d
APT Score	20.37	15.82	59	< .001	2.04
GPA	0.89	13.47	59	< .001	1.74
Mindset Score	1.27	14.21	59	< .001	1.83

The paired sample t test results in Table 8 for the experimental group show a statistically significant increase in APT scores, GPA, and growth mindset scores from pretest to posttest, as all p values are less than .001. The magnitude of these changes is substantial, with very large effect sizes observed across all variables, indicating strong improvements following the intervention. These results demonstrate that the experimental group experienced marked gains in both academic performance and mindset measures over the study period.

### Control Group

**Table 9: Paired Sample t Test for Control Group (Pretest vs Posttest)**

Variable	Mean Difference	t	df	p value	Cohen's d
APT Score	4.19	3.12	59	.003	0.40
GPA	0.22	2.45	59	.017	0.32
Mindset Score	0.12	1.28	59	.205	0.16

The results in Table 9 indicate that the control group experienced a small but statistically significant improvement in academic performance, as reflected by both APT scores ( $p = .003$ ) and GPA ( $p = .017$ ), though the effect sizes were small (Cohen's  $d = 0.40$  and  $0.32$ , respectively). Growth mindset scores showed no significant change ( $p = .205$ ), suggesting that without the intervention, students' beliefs about intelligence remained largely unchanged. Overall, these findings imply that conventional academic activities led to minor gains in performance but did not meaningfully influence mindset.

### 3.3 Independent Sample t Test Results

Independent sample t tests were conducted to compare differences between experimental and control groups at posttest.

**Table 10: Independent Sample t Test Comparing Experimental and Control Groups (Posttest)**

Variable	Mean Difference	t	df	p value	Cohen's d
APT Score	16.62	12.04	118	< .001	1.55
GPA	0.69	10.21	118	< .001	1.31
Mindset Score	1.17	13.33	118	< .001	1.72

The independent sample t tests in Table 10 indicate that, at posttest, the experimental group significantly outperformed the control group across all measured outcomes. The mean difference of 16.62 in APT scores, 0.69 in GPA, and 1.17 in mindset scores were all statistically significant ( $p < .001$ ), demonstrating a substantial effect of the growth mindset intervention. The large Cohen's d values (1.55–1.72) further suggest that the intervention had a strong practical impact on academic performance and students' growth mindset beliefs.

### 3.4 Analysis of Covariance (ANCOVA)

Analysis of covariance was conducted to control for pretest differences while examining posttest outcomes.

#### Academic Performance (APT Scores)

**Table 11: ANCOVA Results for Academic Performance**

Source	SS	df	MS	F	p value	Partial Eta Squared
Pretest Score (Covariate)	412.56	1	412.56	18.73	< .001	.138
Group	1985.42	1	1985.42	90.15	< .001	.435
Error	2567.83	117	21.95			

The ANCOVA results in Table 11 indicate that the pretest scores significantly influenced posttest academic performance, as shown by  $F(1,117) = 18.73$ ,  $p < .001$ , with a moderate effect size (Partial Eta Squared = .138). After controlling for pretest differences, the experimental group that received the growth mindset intervention significantly outperformed the control group on posttest scores,  $F(1,117) = 90.15$ ,  $p < .001$ , with a large effect size (Partial Eta Squared = .435). These findings suggest that the intervention had a substantial positive effect on academic performance beyond baseline abilities.

#### GPA Scores

**Table 12: ANCOVA Results for GPA**

Source	SS	df	MS	F	p value	Partial Eta Squared
Pretest GPA	0.98	1	0.98	11.42	.001	.089
Group	4.62	1	4.62	53.76	< .001	.315

Source	SS	df	MS	F	p value	Partial Eta Squared
Error	10.05	117	0.086			

The ANCOVA results in Table 12 indicate that controlling for pretest GPA, there is a statistically significant difference in posttest GPA between the experimental and control groups ( $F = 53.76$ ,  $p < .001$ ), with the group factor explaining a substantial proportion of the variance (partial  $\eta^2 = 0.315$ ). The pretest GPA also significantly predicts posttest GPA ( $F = 11.42$ ,  $p = .001$ ), though its effect is smaller (partial  $\eta^2 = 0.089$ ). Overall, these findings suggest that the growth mindset intervention had a strong and meaningful impact on students' academic performance as measured by GPA.

### 3.5 Multiple Regression Analysis

Multiple regression analysis was conducted to examine the relationship between growth mindset and academic performance.

**Table 13: Regression Analysis Predicting Academic Performance**

Predictor	B	Standard Error	Beta	t	p value
Constant	32.45	4.12		7.88	< .001
Growth Mindset Score	8.56	1.02	0.62	8.39	< .001

#### Model Summary

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F	p value
0.62	0.384	0.378	70.41	< .001

The multiple regression results in Table 13 indicate that growth mindset is a significant positive predictor of academic performance among low-achieving students. Specifically, for every one-unit increase in growth mindset score, academic performance increases by 8.56 points, holding other factors constant. The standardized beta coefficient ( $\beta = 0.62$ ) suggests a strong effect of growth mindset on performance. Overall, the model explains 38.4% of the variance in academic performance ( $R^2 = 0.384$ ), and the model is statistically significant ( $F = 70.41$ ,  $p < .001$ ).

### 3.6 Effect Size Summary

Effect sizes were calculated using Cohen's  $d$  to determine the magnitude of observed differences.

**Table 14: Summary of Effect Sizes**

Comparison	Variable	Cohen's $d$	Magnitude
Experimental Pre vs Post	APT	2.04	Large
Experimental Pre vs Post	GPA	1.74	Large
Experimental Pre vs Post	Mindset	1.83	Large
Control Pre vs Post	APT	0.40	Small
Control Pre vs Post	GPA	0.32	Small
Between Groups (Posttest)	APT	1.55	Large

Comparison	Variable	Cohen's d	Magnitude
Between Groups (Posttest)	GPA	1.31	Large

The effect size summary in Table 14 indicates that the growth mindset intervention had a strong impact on the experimental group's academic performance and mindset. Large Cohen's *d* values for APT (2.04), GPA (1.74), and mindset scores (1.83) show substantial improvements from pretest to posttest within the experimental group. In contrast, the control group showed only small changes in APT (0.40) and GPA (0.32), indicating minimal natural improvement without the intervention. Comparisons between groups at posttest further confirm the intervention's effectiveness, with large effect sizes for APT (1.55) and GPA (1.31) favoring the experimental group.

### 3.7 Summary of Findings

The results presented include descriptive statistics, paired comparisons within groups, between group comparisons, covariance analysis controlling for baseline differences, and regression analysis examining relationships among variables. Statistical significance was determined at the 0.05 level, and effect sizes were reported to indicate the magnitude of observed differences.

## 4. Discussion

The primary aim of this study was to examine the effects of growth mindset interventions on the academic performance of low-achieving students in higher institutions of learning. The results demonstrate that students in the experimental group who received the growth mindset intervention showed substantial improvements in academic performance, as measured by both Academic Performance Test (APT) scores and GPA, as well as in growth mindset beliefs. The descriptive statistics indicated a marked increase in mean APT scores from 48.35 to 68.72 and mean GPA from 2.12 to 3.01 in the experimental group, compared to minimal gains in the control group. Similarly, growth mindset scores rose from 2.85 to 4.12 among experimental participants, while the control group remained largely unchanged. These findings suggest that the intervention effectively enhanced both academic outcomes and students' beliefs in their capacity to grow intellectually.

Paired sample *t*-tests confirmed the significance of these gains, showing very large effect sizes (Cohen's *d* > 1.7) within the experimental group. Independent sample *t*-tests and ANCOVA analyses further indicated that, after controlling for baseline performance, the experimental group significantly outperformed the control group on all measures, with large effect sizes (Cohen's *d* = 1.31–1.55; partial  $\eta^2$  = .315–.435). Multiple regression analysis revealed that growth mindset scores were significant positive predictors of academic performance ( $\beta$  = 0.62,  $p$  < .001), explaining 38.4% of the variance in performance outcomes. These findings align with prior research by Fink et al. (2023), who reported substantial performance gains among nontraditional students following growth mindset interventions, and with Svensen (2026), who highlighted the positive link between mindset and academic achievement in upper secondary students.

From a theoretical perspective, these results support Dweck's (2021) mindset theory, which posits those beliefs about intelligence influence motivation, learning strategies, and ultimately academic outcomes. The strong correlation between growth mindset and improved performance observed in this study suggests that fostering adaptive beliefs about intelligence can produce tangible academic benefits, particularly for low-achieving students. This finding corroborates Yeager et al. (2019, 2022), who demonstrated that mindset interventions have the greatest impact on students at risk of underachievement.

Practically, these findings have important implications for higher education institutions. Universities may consider integrating structured growth mindset interventions into academic support programs, particularly for students struggling with performance. Such interventions could include workshops, mentoring, or online modules focused on strategies for learning, resilience, and self-regulation, consistent with approaches reported by Xu, Broadbent, and Zhang (2024) in Chinese higher education contexts. These programs may not only improve grades but also foster a sustained belief in students' capacity for growth, which can influence lifelong learning outcomes.

Despite these positive outcomes, the study had limitations. First, the sample was restricted to a single institution and a specific population of low-achieving students, which may limit generalizability. Second, the study period was relatively short, so long-term effects of the intervention remain unknown. Future research should explore longitudinal impacts of growth mindset programs across multiple institutions, diverse academic disciplines, and larger sample sizes. Additionally, qualitative methods could provide deeper insights into how students internalize and apply growth mindset principles in their academic activities, extending the work of Chow and To (2025) on the mediating role of mindset in technology-enhanced learning.

The study confirms that targeted growth mindset interventions significantly improve academic performance and mindset among low-achieving university students, reinforcing both theoretical and practical understandings of mindset-based educational strategies.

## 5. Conclusions

This study demonstrates that growth mindset interventions can substantially enhance academic performance and mindset beliefs in low-achieving students within higher education. The experimental group, which participated in structured mindset activities, exhibited significant improvements in APT scores, GPA, and growth mindset scores compared to the control group, which experienced minimal change. Regression analyses confirmed that growth mindset is a strong positive predictor of academic performance, highlighting its central role in student learning outcomes.

These findings carry important educational implications. Universities and policymakers should consider embedding growth mindset initiatives into academic support structures, particularly targeting students at risk of underperformance. Doing so may promote not only immediate academic gains but also long-term engagement and self-efficacy in learning. Furthermore, instructors could integrate mindset-oriented teaching practices, such as formative feedback and goal-setting exercises, to reinforce adaptive beliefs about intelligence.

While the study provides compelling evidence of the intervention's efficacy, further research is necessary to examine long-term effects, broader populations, and the mechanisms through which mindset influences learning strategies. Such investigations could inform scalable programs that enhance student achievement across diverse higher education contexts.

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## Conflict of Interest

The authors declare no conflicts of interest related to this study.

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