Salud, Ciencia y Tecnología. 2025; 5:1737
doi: 10.56294/saludcyt20251737

ORIGINAL

The Impact of Transformational Leadership and Student Self-Resilience on Academic Performance in China's Vocational Education

El impacto del liderazgo transformacional y la resiliencia de los estudiantes en el rendimiento académico en la educación profesional de China

Hao Yu[1], Irwan Mahazir bin Ismail[2]

[1]School of Education, Universiti Utara Malaysia.
[2]College of Arts and Sciences Pendidikan, Universiti Utara Malaysia

Cite as: Yu H, bin Ismail IM. The Impact of Transformational Leadership and Student Self-Resilience on Academic Performance in China's Vocational Education. Salud, Ciencia y Tecnología. 2025; 5:1737. https://doi.org/10.56294/saludcyt20251737

Submitted: 26-11-2024 **Revised:** 10-03-2025 **Accepted:** 23-07-2025 **Published:** 24-07-2025

Editor: Prof. Dr. William Castillo-González

Corresponding author: Hao Yu

ABSTRACT

Introduction: academic performance in vocational education is influenced by multiple psychological and institutional factors. Among these, Transformational Leadership (TL) from educators and Student Self-Resilience (SSR) are recognized as critical, yet their combined influence remains insufficiently examined within China's vocational education context.
Objective: this study aims to examine the direct effect of teacher transformational leadership on students' academic performance (SAP) and to assess whether student self-resilience mediates this relationship.
Method: a cross-sectional survey was conducted among 511 students from vocational colleges in Chongqing, China. Expectancy theory served as the theoretical framework. Data were analyzed using SmartPLS 4 to implement structural equation modeling (SEM) via partial least squares (PLS), allowing for assessment of path coefficients, mediation effects, explained variance (R^2), and effect sizes (f^2).
Results: transformational leadership had a significant positive direct effect on both student academic performance and student self-resilience. Additionally, self-resilience was found to significantly and positively influence academic performance. Mediation analysis revealed that SSR partially mediated the relationship between TL and SAP, indicating that SSR is an essential mechanism through which TL impacts academic outcomes.
Conclusions: the findings support the integration of transformational leadership and student self-resilience development in vocational education. They extend expectancy theory by highlighting SSR as a key personal resource that enhances the effectiveness of leadership on academic outcomes. Practical implications suggest vocational institutions should invest in leadership development for teachers and implement resilience-building programs for students to sustain high academic performance.

Keywords: Transformational Leadership; Student Self-Resilience; Students' Academic Performance; Vocational Education; Smart_PLS.

RESUMEN

Introducción: el rendimiento académico en la formación profesional está influenciado por múltiples factores psicológicos e institucionales. Entre ellos, el liderazgo transformacional (LT) de los educadores y la resiliencia de los estudiantes (RS) se reconocen como fundamentales, pero su influencia combinada sigue sin estar suficientemente estudiada en el contexto de la formación profesional en China.
Objetivo: el presente estudio tiene como objetivo examinar el efecto directo del liderazgo transformacional

de los profesores en el rendimiento académico de los estudiantes (SAP) y evaluar si la resiliencia de los estudiantes media en esta relación.
Método: se realizó una encuesta transversal a 511 estudiantes de escuelas de formación profesional de Chongqing, China. La teoría de la expectativa sirvió de marco teórico. Los datos se analizaron utilizando SmartPLS 4 para implementar el modelo de ecuaciones estructurales (SEM) mediante mínimos cuadrados parciales (PLS), lo que permitió evaluar los coeficientes de ruta, los efectos de mediación, la varianza explicada (R^2) y los tamaños del efecto (f^2).
Resultados: el liderazgo transformacional tuvo un efecto directo positivo significativo tanto en el rendimiento académico de los estudiantes como en su resiliencia. Además, se encontró que la resiliencia influía de manera significativa y positiva en el rendimiento académico. El análisis de mediación reveló que la SSR mediaba parcialmente la relación entre el TL y el SAP, lo que indica que la SSR es un mecanismo esencial a través del cual el TL influye en los resultados académicos.
Conclusiones: los resultados respaldan la integración del liderazgo transformacional y el desarrollo de la autorresiliencia de los estudiantes en la formación profesional. Amplían la teoría de la expectativa al destacar la SSR como un recurso personal clave que mejora la eficacia del liderazgo en los resultados académicos. Las implicaciones prácticas sugieren que las instituciones de formación profesional deberían invertir en el desarrollo del liderazgo de los profesores e implementar programas de fomento de la resiliencia para los estudiantes con el fin de mantener un alto rendimiento académico.

Palabras clave: Liderazgo Transformacional; Autorresiliencia de los Estudiantes; Rendimiento Académico de los Estudiantes; Formación Profesional; Smart_PLS.

INTRODUCTION

Educational leaders and policymakers prioritize the enhancement of student performance as a fundamental objective within the contemporary educational framework. The factors that shape academic success go beyond cognitive ability because student achievements depend heavily on main key elements: psychological factors and social factors along with environmental factors.[1] The educational performance of students depends most heavily on two main factors which are teachers' leadership styles and students' psychological resilience.[2]

China operates its vocational education through three institutional levels: Secondary Vocational Schools, Higher Vocational Colleges and Technical and Skilled Worker Schools which provide specialized education for different student populations.[3] These institutions blend basic academic education with practical vocational skills that provide industry-level abilities to students. The rise in vocational enrollment has been substantial because millions of students have selected three-year study programs that result in high employment rates through joint efforts between educational facilities and industrial partners.[4] Quality issues and outdated equipment and the requirement for ongoing curriculum changes remain as obstacles in the system.[4,5]

The Chinese government uses several supportive policies through scholarships and funding schemes and collaboration incentives under the national strategy "Made in China 2025" to resolve these issues.[6] The national government works to enhance collaboration with Germany and Switzerland for acquiring advanced training models and methods from these countries. The improvement of vocational education focuses on facility modernization while it updates curricula to match industrial developments and improves vocational education reputation for students and families. The world's biggest vocational education system operates in China because it produces annually 10 million graduates through its international program Luban Workshops which spreads Chinese influence abroad.[7]

Educational psychology researchers today highlight transformational leadership as the fundamental element which shapes classroom environments.[8,9] Through principal behaviors of idealized influence and intellectual stimulation and inspirational motivation and individualized consideration they create classrooms that develop academic performance while promoting psychological maturity in students.[10,11] Student leadership through such methods develops student trust while granting power and strengthening belief which leads to improved academic performance along with behavioral outcomes.[12]

The success of China's vocational education hinges not only on infrastructure and policy but also on transformational leadership and student resilience.[13] Transformational leaders are fundamental for innovation development while linking academic goals with economic objectives and through their visionary leadership they motivate educators.[14,15] Student resilience serves as an essential tool for students to deal with obstacles and market changes and maintain continuous learning throughout their lives.[16,17] When these elements unite, they create an educational system which responds effectively and remains powerful for producing graduates who achieve sustainable career success alongside national development through their technical expertise paired with personal abilities.[18]

Research and practical evidence about teacher leadership and student self-resilience within China's vocational educational establishments has not received sufficient attention as the country acknowledges vocational education's importance for economic development.[19,20] The inconsistent implementation of transformational leadership practices stands as a primary deficit among vocational education staff.[21] China's vocational colleges have no consistent method to develop or implement teacher leadership although some educational institutions use effective leader models.[5,20,22] The fluctuating leadership approach creates challenges for students to succeed in uncertain workplace situations.[23,24] The insufficient professional training in leadership development coupled with resilience education for vocational educators limits their capacity to teach these qualities to their students.[6]

Literature about teacher competencies primarily addresses vocational settings yet provides insufficient analysis regarding professional development and lifelong learning paths that produce these competencies.[12,25] Research must focus on conducting empirical investigations regarding how leadership development training impacts teaching operations and student achievement results within the vocational education context.[22] The positive connection between leadership and student outcomes needs more investigation regarding its direct impact on student resilience and career development because of the absence of focused research about transformational leadership.[18,26] A comprehensive leadership development initiative requires immediate attention because different levels of leadership receive insufficient focus including institutional and departmental leadership.[27]

Vocational education in China needs to establish structured self-resilience development because students must possess this essential skill to succeed in technology-oriented labor markets.[28] Academic curricula do not include sufficient content about resilience training and schools meet barriers when trying to implement and support such programs due to resource limitations.[29,30] The existing quality evaluation system of vocational education in China uses external metrics primarily to assess graduate employment success and industry industrial alignment. Very little scholarly work exists about internal elements of educational development such as curriculum planning and institutional backing as well as pedagogical approaches which advance student leadership with holistic achievements.

Based on the above discussion this research has three main research objectives:

- R01: To examine the significant relationship between teachers' transformational leadership and students' academic performance.
- RO2: To examine the significant relationship between self-resilience and students' academic performance
- RO3: To examine the mediating role self-resilience between teachers' transformational leadership and student academic performance.

Literature review

The transformational leadership of teachers and self-resilience of students are the key interrelated variables that affect the academic performance of students especially in the light of Expectancy Theory. Transformational teachers encourage students through high expectations, providing individual attention, and instilling the sense of belief in achievement, enhancing students' expectancy, and value perceptions of academic achievements. The leadership style is particularly effective in vocational and resource-constrained settings. Simultaneously, self-resilience in students helps them to endure difficulties, develop flexible coping measures, and sustain long-term academic commitment. Studies have always demonstrated that strong students achieve more academically and that resilience mediates the connection between transformational leadership and academic achievement. In such a way, transformational leadership contributes to the academic performance directly and indirectly by fostering the resilience of students, which is a psychological tool that preserves engagement, motivation, and adaptability to various educational and cultural environments.

Expectancy Theory Perspective

The academic performance effects of teacher transformational leadership and student self-resilience receive theoretical foundation through Expectancy Theory as formulated by Vroom.[31] According to this theory a person becomes motivated through their belief that successful performance follows their efforts (expectancy), while performance generates important outcomes (instrumentality) which have personal value (valence).[17] The theory provides valuable understanding about how environmental supports including teacher leadership combine forces with students' internal attributes including resilience to affect their academic performance and results in vocational education contexts.[32]

Students' expectancy beliefs receive essential development through the leadership approach of transformational teachers. Transformational teachers develop student beliefs about success through their delivery of motivational inspiration combined with personalized support and intellectual educational methods.[33] The leadership behaviors promote student motivation while generating educational spaces that encourage

student feelings of support and reimbursement and capability.[34] Students put more effort because they detect their teachers authenticate belief in their capabilities along with structured instruction that guides them effectively.[26] The approach of transformational leadership proves especially useful at vocational education institutions because students frequently encounter stigma along with resource limitations yet this style helps students build their confidence when learning and performing.[35,36]

Student self-resilience stands as a key mechanism inside each student which helps connect leadership approaches to their academic results.[37] Through resilience students learn to handle changes in their environment while bouncing back from obstacles which keeps them focused on distant aspirations.[38] A student's belief that effort brings success becomes stable through both outside encouragement and their internal readiness to confront challenges according to Expectancy Theory.[8] The ability to stick with academic challenges illustrates how resilient students view challenges as short-lived issues and persist through difficulties towards their educational objectives. The personal resource of self-resilience converts motivation from teacher leadership into meaningful academic engagement alongside the achievement of goals.[39]

The components of instrumentality and valence in the theory help identify the motivational strength of vocational education when teaching goals align with student objectives.[40] Academic persistence extends from students who perceive their academic success will bring realistic benefits including employment chances along with career progression and economic stability.[9] The connection between learning content and future accomplishment which transformational leaders effectively communicate helps students develop higher value for their academic work.[41] Students who demonstrate inherent self-resilience demonstrate the best ability to maintain necessary efforts toward goal achievement particularly in difficult circumstances brought by complex social or economic barriers.[42]

The research model supported by Expectancy Theory because it demonstrates how transformational leadership creates motivational patterns between self-resilience and academic performance.[30] Through its leadership style transformational leadership boosts students' beliefs which help them value academic success more highly. Student self-resilience allows them to convert motivational freedoms into practical action through academic and life challenges. The research shows that self-resilience operates as both an essential predictor and an essential connector which enables teacher leadership to influence academic performance.[43]

Teachers' Transformational Leadership and Student Academic Performance

The teacher-leader takes knowledge transmission to higher levels by using a united educational objective to motivate students through mental stimulation and personal assistance. Slavich and Zimbardo[33] find that transformational education develops through building active classrooms alongside enduring connections between teachers and their students for student advancement. Research identifies teacher leadership actions of creating high expectations together with promoting innovative thinking alongside genuine student support as factors which supposedly boost students' efforts and academic performance.[19,44] Various empirical studies conducted in different nations at multiple educational levels demonstrate that transformational leadership behaviors among educators produce better academic results in students. Balwant[45] conducted a research analysis which revealed that teachers who employ transformational leadership tend to receive positive results from students by boosting motivation while also enhancing instructor satisfaction and improving grades.[36] Many independent investigations confirm these results. The transformational leadership approach of Singaporean school administrators generated both positive results for teacher workplace satisfaction and enhanced academic test scores of students as noted by Koh.[46] Udin[47] stressed that student performance and motivation increased when teachers adopted transformational rather than transactional leadership at the university stage. Trigueros[48] investigated 3,354 Spanish undergraduate students through a multivariate analysis to show that responsive classroom leadership from teachers resulted in improved student grades through motivational outcomes. The research model confirmed students experience better academic resilience and motivation as their instructors display high transformational leadership practices that lead to academic performance.

The findings present important context-specific elements even though a direct effect may not exist in all situations. A sample of 370 Malaysian university students from Rahman[49] did not show any significant direct link between lecturer transformational leadership and student Grade Point Average (GPA). The research conducted in China establishes parallel results which extend with distinctive observations to international results. For example, a recent study by Liu[5] in rural Chinese secondary schools found that principals' transformational leadership contributed to higher student achievement (measured by standardized test scores) indirectly by first increasing teacher commitment and fostering a collaborative school culture This suggests that at the school level, transformational leadership trickles down – motivating teachers and improving the learning climate, which ultimately benefits student performance.[50] Students enrolled at Hebei Province universities showed better academic results when they perceived their instructors to display transformational leadership based on a study by Liu.[51] Student academic achievement increased through their psychological capital combined with self-regulated learning habits while conscientiousness acted as a moderation factor in this effect. On the basis

of above discussion, it can be hypothesized that:

- H1: Transformational leadership has a significant relationship with students' Academic performance.

Student Self-Resilience and Student Academic Performance

Student self-resilience represents the psychological capability to convert academic challenges into positive outcomes which strongly affects students' academic outcomes and classroom engagement. Students who demonstrate academic resilience maintain their focus and drive for success along with their persistence through academic challenges to achieve long-term academic results.[40,52] Studies demonstrate that resilient students tend to choose optimal coping methods and keep going on challenging work while demonstrating better academic performance.[25,53]

Multiple research investigations within different educational settings have proven that students with higher resilience demonstrate better academic achievements. Australian high school students who demonstrated academic resilience showed better motivation levels and engagement with school work and academic performance according to Martin.[54] The research by Sattler and Gershoff.[55] demonstrated that U.S. students with higher resilience showed better reading and math results than students with lower resilience. German university students who demonstrated resilience obtained improved academic results while showing reduced program withdrawal intentions according to Bittmann.[25] According to Li[56] Chinese students who demonstrated resilience performed better academically especially in demanding circumstances while positive academic emotions including hope and enjoyment served as mediators between resilience and academic performance. Resilience levels based on mindfulness showed a connection to reduced dropout intentions among Chinese vocational students according to Chen.[57]

Self-resilience affects academic performance yet this relationship depends on how other psychological elements influence the connection. Academic self-efficacy functions as a mediator between self-resilience and academic performance according to Martin[54] and Trigueros.[58] Students who demonstrate resilience tend to have higher self-efficacy levels that strengthen their motivation and enhance their study behaviors as well as their capacity to sustain academic challenges.[27,53] The interaction between resilience develops a key role with emotional intelligence as a significant factor. Students in Nigeria who showed higher resilience levels achieved better emotional intelligence scores according to research[46] and this emotional intelligence acted as a partial link between student resilience and their academic achievements. Research conducted in Chinese higher education institutions indicates that academic engagement as a vital behavioral result links to resilience which demonstrates positive prediction.[7] The previous discussion supports developing the following hypothesis:

H2: Student Self-resilience has a significant relationship with students' Academic performance.

Mediating role of Student Self-resilience between Teachers Transformational leadership and Student Academic Performance

Educators who demonstrate transformational leadership in the classroom use inspirational methods to motivate students through personalized attention as well as intellectual growth and motivational support. These teachers present a defined vision and maintain elevated standards while genuinely supporting students' requirements which aligns with Bass & Riggio's[44] leadership model of idealized influence and inspirational motivation and intellectual stimulation and individualized consideration. Research indicates that this method leads to better student engagement together with higher motivation and improved achievement.[59] Student engagement acted as a significant mediator between instructor behavioral transformational leadership and academic performance according to research conducted in the UK.[59] This demonstrates that teacher leadership affects student outcomes by triggering internal student processes.

Student self-resilience stands as academic resilience which describes students' capabilities to deal with academic challenges alongside their capacity to bounce back from failures. Student self-resilience describes a developmental character which helps learners maintain motivation and persistence when facing challenging situations.[34,39] Students who demonstrate resilience enable themselves to both minimize stress and select appropriate coping strategies and preserve their academic success during trying times.[42,50] Academic resilience serves as a positive predictor of academic success together with emotional well-being and long-term success according to Cassidy[53] and Sun[60]. Studies have demonstrated through research that resilience leads students in Chinese educational environments to engage stronger at school and adjust better academically particularly when students encounter testing stressors and social demands.[61]

Student resilience functions as a mediator which explains how teachers' transformational leadership influences students' academic performance. Students who experienced higher transformational leadership from their teachers according to Trigueros[48] demonstrated better academic performance through their increased resilience and motivation. A structural equation model analysis revealed that leadership-performance connections operate through resilience as a partial intermediary factor. Academic resilience served as an intermediary force which connects personality traits to student GPA according to findings from Choo[62] in

their Malaysian research. Teacher support in Bahrain according to Ahmed[63] strengthens academic engagement through the mechanism of resilience in educational leadership environments.

The majority of research originates from Western societies yet researchers have documented parallel results in Chinese academic settings. Sun[60] established that Chinese university students learning online demonstrated better engagement levels and academic performance according to their resilience levels. Chinese primary and middle school students demonstrated school engagement results because Zeng[61] confirmed resilience operates as a mediator between growth mindset and these measures. Teacher support within urban Chinese schools creates better student school adjustment according to Fang[64] through the enhancement of resilience. The research demonstrates resilience functions as an essential psychological pathway that explains how teacher support and leadership affect student educational results across different cultural settings. Student academic performance improves through teachers who use transformational leadership methods because this strategy helps students build their self-resilience abilities. The academic success of students increases when they demonstrate resilience because it enables better engagement alongside persistence and adaptability.[58, 60] The preceding discussion enables formulating the following prediction:

- H3: Student Self-Resilience mediate the Teacher's transformational leadership relationship with Students' Academic performance.

Research framework

Figure 1 displays the conceptual framework that studies the relationship between teacher's transformational leadership and student self-resilience and its impact on academic performance. Transformational leadership operates as an independent variable that shapes student academic performance results through its motivating and intellectual-stimulating and personalized support-based leadership approach. Evidence in current literature shows that transformational leadership helps students become more motivated and engaged and achieve better results.[48,59]

The proposed model contains student self-resilience as a variable which connects different sections of the model. The psychological capability of facing obstacles in academic learning while staying focused and continuing toward academic targets stands as resilience according to Cassidy[53] and Sun[60]. Students' academic achievements gain direct improvement from transformational leadership and students develop increased resilience which leads to improved academic performance. Through their access to supportive leadership students increase their resilience which allows them to handle academic pressure while maintaining elevated engagement levels to achieve improved academic results.[58,64]

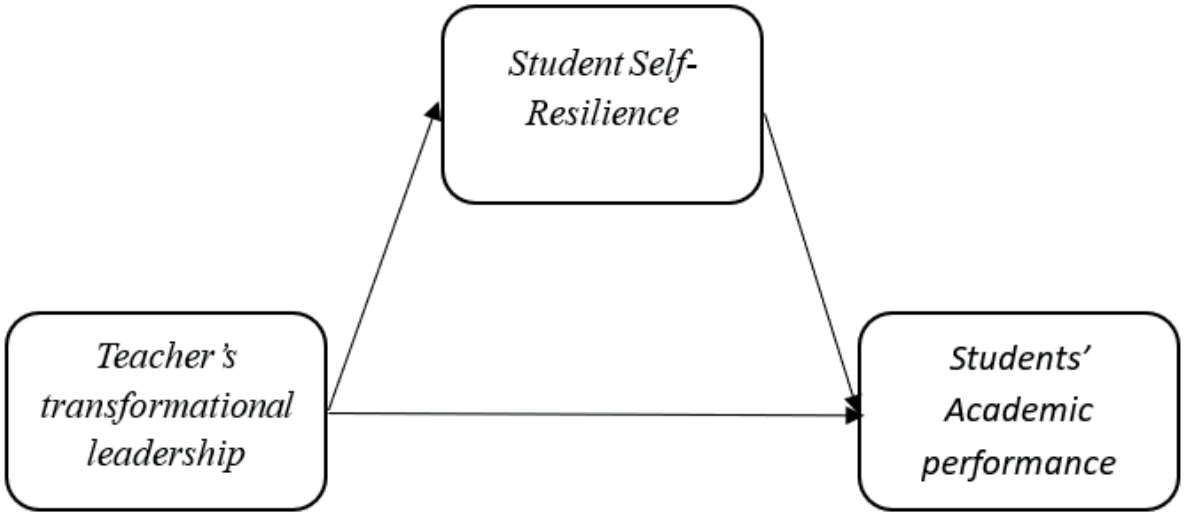

Figure1. Research framework.

METHOD

Research Instruments

Transformational Leadership Scale

The study implemented the Transformational Leadership Scale (TLS) to evaluate teacher leadership while drawing upon Bass and Avolio[65] transformational leadership theory. Through its 15-item adopted and evaluation

the TLS measures teachers' ability to establish ethical leadership and student respect (idealized influence) as well as their capacity to inspire motivational vision (inspirational motivation) and their methods to promote creativity and critical thinking (intellectual stimulation) and their personalized support for individual student needs (individualized consideration). Teachers can measure their transformational leadership strength through the instrument by using a Likert rating system from "Strongly Disagree" to "Strongly Agree" which provides higher scores for stronger leadership abilities. The tool possesses established reliability and validity according to Bass[65] which makes it an effective instrument for measuring teacher leadership behaviors.

Student Self-Resilience Scale

The study used a 5-point Likert scale to measure student resilience through an 18-item questionnaire adopted from Smith[66] (1 = not at all to 5 = very true). The questionnaire rates seven different components which include positive worldview and positive self-view alongside focus and flexibility as well as organization and proactivity. The overall resilience level is measured through total scores in this assessment and stronger resilience is displayed by higher score points. The scale exhibits strong psychometric properties according to previous research showing both internal consistency and construct validity.[66]

Student Academic Performance Scale

The study adopted 13-item scale to measure academic performance according to Eccles[67] expectancy-value theory. The instrument evaluates academic motivation through two dimensions that assess students' academic capability beliefs and academic task importance together with perceived benefits. Each Likert scale item presents a range from "Strongly Disagree" to "Strongly Agree" which generates higher scores when students show stronger motivation and academic success alignment. The tool's validity and reliability documented in Eccles[67] create a standardized method to assess motivational factors that drive student achievement.

Data Collection Procedure

The researcher used systematic procedures to obtain data from vocational college students in Chongqing China who did or did not participate. The research procedure required the following sequence of steps:

The researcher-initiated contact with each vocational college in Chongqing, China. The researcher asked for cooperation from institutions to acquire student data. The researcher directly communicated with the coordinators responsible for different departments at vocational colleges. The researcher distributed questionnaires through department coordinators who further sent them to students who were selected through simple random sampling. The methodology provided representation of every academic year along with every department. The researcher distributed extra questionnaires above the minimum sample requirement to handle cases of missing or incomplete responses.[68]

The researcher reached out to student affairs offices throughout all vocational colleges because these offices managed student activities as well as organizations. The researcher scheduled a meeting with the student affairs office to explain the research objectives before seeking help to contact sport-active students. The researcher established communication with student committees and student councils and club leaders of sporting groups. Student leaders applied simple random sampling to distribute questionnaires across the participant group for fairness and adequate representation. The data collection process involved distributing 600 questionnaires to the target respondents. Of these, 535 questionnaires were duly returned, which gave an initial response rate of about 89,2 %. On close examination, it was identified that 24 of the returned questionnaires were incomplete, incorrectly filled or inconsistent and hence were not suitable to be analyzed. These were then excluded in the dataset. Following rigorous data screening and validation, 511 completely answered and usable questionnaires remained to be used in further statistical analysis. This guaranteed reliability and accuracy of the research findings.

Sample Size Estimation

A statistical power analysis revealed that we required around 400 valid responses as an assurance to identify significant outcomes from our multi-dimensional research model. To offset the anticipated low response rate, we sent 600 questionnaires yet aimed to maintain an adequate sample size for sound data analysis during its completion. Table 1 describes the socio-demographic indicators of the 511 individuals who completed research while showing variables that included gender age educational duration current CGPA and place/district of residence.

Table 1. Socio-Demographic Characteristics of Respondents (N = 511)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	350	68,5
	Female	155	30,3
	Other	6	1,2
Age	Under 18	50	9,8
	18-20	220	43,0
	21-23	150	29,4
	Over 23 45-54	91	17,8
Year of study	First year	150	29,4
	Second year	180	35,2
	Third year	110	21,5
	Fourth year	60	11,7
	Other	11	2,2
Current CGPA	Below 2,0	6	1,2
	2,0 - 2,49	80	15,7
	2,5 - 2,99	300	58,7
	3,0 - 3,49	100	19,6
	More than 3,49	25	4,9
Location/Region	Eastern China	200	39,2
	Southern China	100	19,6
	Northern China	80	15,7
	Western China	70	13,7
	Central China	61	11,9

RESULTS

Measurement Model Assessment

Smart PLS 4 is a leading graphical software tool designed for partial least squares structural equation modeling (PLS-SEM) and covariance-based SEM (CB-SEM).[11,22,28,68] It offers an intuitive drag-and-drop interface that simplifies the construction, estimation, and evaluation of complex path models.[14,15,28] Studies using SMART-PLS produced measurement model results with solid psychometric properties according to table 2.[69] All constructs achieve satisfactory indicator loadings which confirms their items' reliability in measuring their respective constructs. The 15-item scale for Transformational Leadership yielded values of 0,721 to 0,832 for loadings while CR was 0,890 and AVE reached 0,540. Student Self-Resilience demonstrated acceptable measurement properties using 17 items with loadings between 0,652 and 0,839 and CR of 0,915 and AVE of 0,575. Likewise, Student Performance measured by 13 items yielded loadings from 0,711 to 0,811, CR of 0,810 and AVE of 0,517. The assessment establishes correct indicator loading values and demonstrates how CR exceeds 0,70 and how AVE reaches and surpasses 0,50. The construct evaluation results demonstrate positive evidence regarding construct internal consistency together with construct convergent validity which enables robust hypothesis testing.

The study constructs showed their correlations in table 3 as shown by Average Variance Extracted (AVE) square root values on the diagonal and Heterotrait-Monotrait (HTMT) ratios inside the off-diagonal cells. The square root value of AVE for Transformational Leadership reached 0,735 while demonstrating higher similarities between itself and other constructs than its links to Student Self-Resilience (0,416) and Student Performance (0,352). Correspondingly, the HTMT ratios were 0,432 and 0,399. The values for Student Self-Resilience fulfilled criterion as it demonstrated a square root AVE of 0,766 and a relationship of 0,473 with Student Performance and an HTMT ratio of 0,531. The measurements upheld discriminant validity because all constructs had square root AVE metrics that exceeded their correlations with other investigated variables. All HTMT ratios presented between 0,399 and 0,531 fell underneath the recommended limit of 0,85,[29] thus affirming the uniqueness of the constructs. The results in table 3 indicated the measurement model's suitability for further analysis because they displayed robust data validity.

Table 4 showed structural model findings which supported all theoretical relationships tested in our study. The results from Hypothesis H1 demonstrated that Transformational Leadership (TL) significantly and positively influenced Students' Academic Performance (SAP) at O = 0,146 (p = 0,001). This finding showed that SAP grew

when TL received increased attention. The obtained results demonstrate that a particular style of executing transformational leadership brings positive effects on the performance levels of students in this context.

Table 2. Measurement Model Results

Constructs	No. of Items	Indicator Loadings (Range)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Transformational Leadership	15	0,721 - 0,832	0,890	0,540
Student Self-Resilience	17	0,652 - 0,839	0,915	0,575
Student Academic Performance	13	0.711 - 0,8,11	0,810	0,517

Table 3. Correlations, Square Roots of AVE, and HTMT Ratios

	Transformational Leadership	Student Self-Resilience	Student Academic Performance
Transformational Leadership	(√AVE) 0,735	0,416 (0,432)	0,352 (0,399)
Student Self-Resilience		(√AVE) 0,766	0,473 (0,531)
Student Academic Performance			(√AVE) 0,829

Table 4: Summary of Structural Model

Measure	O	STDEV	T	P	2,50 %	97,50 %	Value
H1: TL → SAP	0,146	0,042	3,476	0,001	0,133	0,023	
H2: SSR → SAP	0,090	0,034	2,626	0,009	0,026	0,161	
H3: TL → SSR → SAP	0,056	0,021	2,656	0,008	0,017	0,098	
R^2 for SSR							0,382
R^2 for TL							0,488
f^2: TL → SAP							0,026
f^2: SSR → SAP							0,034
f^2: AIEWP → AILES							0,565

The study indicated through Hypothesis H2 that Students Self-Resilience (SSR) directly impacted academic performance (SAP) at 0,090 (p = 0,009). This effect demonstrated positive associations between student resilience levels and academic achievement. Students need to develop resilience because it emerges as a crucial ability which promotes academic achievement.

SSR played a significant role in bridging the connection between TL and SAP because it acted as a meaningful mediator through which the relationship operated with an effective impact of 0,056 (p = 0,008). Results from mediation demonstrate that the positive impact of TL on academic achievement lessens whenever students develop higher self-resilience.

The proposed model successfully accounted for important construct variances through determination coefficients of 0,382 for SSR and 0,488 for SAP. The direct relation between TL and SAP measured an effect size of 0,026 while SSR to SAP showed an effect size of 0,034. The research findings show that student self-resilience works as a vital intermediary factor which explains how transformational leadership produces academic outcomes through moderate effect size mechanisms. These study results establish a solid base for understanding how leadership principles combine with student resilience for affecting academic achievement outcomes.

DISCUSSION

Table 4 presented the structural model results that supported all proposed relationship hypotheses strongly. Research findings indicated that Transformational Leadership (TL) has a positive effect on Students' Academic Performance (SAP) with an effect size of O = 0,146 at p = 0,001 level. This shows that heightened TL leads to increased SAP. The implementation method of transformational leadership in educational environments produces direct performance improvement for students. The findings connect to both traditional Bassian leadership wisdom (1985) and present-day findings showing supportive leadership produces beneficial learning conditions and enhanced academic results.[2,48]

The analysis under Hypothesis H2 demonstrated Student Self-Resilience (SSR) directly boost Academic Performance (SAP) by 0,090 at a significance level of p = 0,009. Research demonstrates that self-resilience

plays an essential role in academic achievement thus confirming previous findings based on Luthans[52] and Masten[70].

Hypothesis H3 gained support from the experimental findings which showed SSR acted as a statistical mediator between TL and SAP and produced an indirect effect of 0,056 (p = 0,008). Student self-resilience acts as a mediator between transformational leadership and academic performance by directing both the direct and indirect positive effects of TL on student outcomes. The performance impact of transformational leadership extends beyond direct results because leaders promote student resilience that generates additional academic benefits. Research by Trigueros[58] and Sun[60] proves this mediational chain as they establish psychosocial factors as essential mechanisms linking leadership to student achievement.

Predictors in the model account for 38,2 % of SSR variance and 48,8 % of SAP variance thus explaining most of the variations in both scales. The f^2 effect sizes measuring the relationships between leadership (0,026 for TL → SAP) and resilience (0,034 for SSR → SAP) show their contributions are substantial to academic performance. Students must receive support to develop effective transformational leadership alongside resilience because these factors together create strong academic performance results.

According to the findings of the structural model, vocational institutions in China can institutionalize resilience-building programs by incorporating them into transformational leadership activities that facilitate student motivation and academic participation. The results show that transformational leadership (TL) positively affects the academic performance (SAP) of the students directly (0,146, p = 0,001) and indirectly through student self-resilience (SSR) which has a direct positive influence on SAP (0,090, p = 0,009) and mediates the relationship between TL and SAP (indirect effect = 0,056, p = 0,008). To do so, institutions can integrate resilience-oriented materials into curricular, train teachers on transformational leadership skills, and develop support systems, including counseling, peer mentoring, and workshops that would help students to develop their coping strategies and persistence. Since the model explains 38,2 percent of the variance in SSR and 48,8 percent in SAP, it is critical to focus on resilience development and leadership to improve student success in vocational education settings.

Theoretical Implications

The study adds insights to leadership research along with academic performance assessment through the lens of expectancy theory. People become motivated when they believe their work efforts will produce exceptional results which will earn them desired rewards according to expectancy theory.[31] Transformational leadership practices that educators effectively deliver within educational settings make students believe more strongly in their ability to achieve success. When transformational leaders present a motivational vision with precise performance standards, they drive students to anticipate better academic results which leads to actual academic improvement.

The motivational processes between transformational leadership and student achievement depend heavily on student self-resilience which operates as a fundamental personal asset. Student resilience determines how much students feel capable of facing challenges while reaching their academic goals. Recent studies support the notion that resilient students actively invest their efforts in challenging situations through the “instrumentality” and “valence” components described by Balwant[45] and Luthans[52]. Our analysis reveals that self-resilience acts independently to boost academic outcomes and functions to explain the results of transformational leadership. The mediation demonstrates that when teachers develop environments which strengthen resilience, they strengthen academic expectancy beliefs which leads students to reach better outcomes despite academic pressure.

The mediation result of this study is an extension of the Expectancy Theory as it empirically shows that Student Self-Resilience (SSR) is a central psychological mechanism through which Transformational Leadership (TL) affects the Academic Performance of Students (SAP). Conventional uses of Expectancy Theory focus on motivation as a product of individuals believing that effort produces performance (expectancy), performance produces valued outcomes (instrumentality) and that valued outcomes are personally valued (valence). This paper extends that knowledge by demonstrating that transformational leadership behaviors reinforce the expectancy beliefs of students not only by directly motivating and supporting them but also by developing resilience, which allows students to translate motivation into long-term effort and academic performance, especially in difficult settings. The statistically significant indirect effect (0,056, p = 0,008) supports that SSR mediates the TLSAP relationship, and the results demonstrate that teacher-led motivational support is beneficial to students in terms of building internal abilities to persist, adapt, and engage, which leads to stronger academic outcomes. This contributes to the theoretical range of Expectancy Theory by incorporating resilience as a mediating cognitive-affective resource, thus promoting knowledge of the role of leadership in student motivation and performance beyond the immediate expectancy judgments. The results present new knowledge to the literature of educational leadership as it confirms that transformational leadership not only directly affects outcomes, but also indirectly through the arousal and strengthening of student self-beliefs and

coping abilities which fits and expands Expectancy Theory in education.

The research builds upon established leadership concepts through expectancy theory to show that educational staff who develop nurturing relationships alongside mental resilience enable students to better understand how their work leads to successful results.

Practical Implications

The research findings provide specific approaches which educational administrators and teaching staff along with policymakers can use to improve teaching proficiency and academic success. Research outcomes indicate that professional development benefits increase when schools teach transformational leadership practices to their personnel. The development of educational training programs by officials and supervisors needs dedicated sections to teach transformational educational practices which include vision formation along with student-specific mentorship and intellectual growth stimulation. Educational institutions should adopt these practices into teacher training because they create an environment with better student engagement and more support alongside enhanced innovation which leads to higher academic success.

The research shows self-resilience among students functions as a core factor which determines their academic outcomes. Institutional programs that develop resilience should be essential components because the mediating function demands such attention. Teacher-supported programs should connect students to teaching professionals along with resilient classmates and provide resilience training along with counseling and peer support networks. The implemented interventions provide students with necessary competencies which enable them to handle academic challenges efficiently thus leading to more successful outcomes.

The vocational education system in China has its own peculiarities, which include low social status, resource inequality, and rural-urban inequality, which have a strong influence on the interaction between transformational leadership (TL), student self-resilience (SSR), and student academic performance (SAP). Transformational leadership, in this regard, proves especially effective since it provides students with motivational opportunities and personal guidance as they frequently experience social stigma and lack academic encouragement. Such leadership actions assist in inculcating expectancy beliefs and academic purpose that are important in situations where students might not be externally validated or supported by the institution. Simultaneously, self-resilience as a critical inner process becomes a way through which students develop the ability to persevere in the face of systemic difficulties, become resourceful in the face of scarcity, and remain engaged in the learning process. In the vocational education context in China, the TL-SSR-SAP connection is thus exceptionally strengthened with resilience serving as the main channel through which leadership can be transformed into effective academic performance in a manner that offsets structural and social disadvantage.

The merger of leadership development with resilience-building initiatives leads to parallel ways for students to achieve better academic results. The educational environment strengthens when teachers obtain leadership skills and students develop resilience techniques so learning success becomes more probable. The combined approaches between leadership development and resilience-building methods protect schools from professional and educational changes while creating sustainable conditions for both academic performance and student well-being.

Limitations and future research directions

This research introduces important relationships between transformational leadership and student self-resilience which influence academic outcomes yet multiple study constraints require recognition. The data were collected exclusively from vocational institutions in Chongqing, a region with distinct cultural and socioeconomic characteristics, which may limit the generalizability of the findings to other Chinese regions with differing educational structures and student demographics. The gathered data from our particular professional and cultural setting restricts the wider applicability of our research findings. Extra research should investigate various cultural groups across numerous organizational environments to strengthen the real-world application of research outcomes.

The cross-sectional design used in this research prevents us from establishing definite cause-and-effect relationships between transformational leadership and self-resilience with academic success. Such research designs as longitudinal or experimental ones would enable us to see these variables' dynamic relationship throughout time. To enhance future research, longitudinal research ought to be carried out over at least 12 to 24 months with data to be collected at three critical points, the start of the academic year (baseline), mid-year (formative phase), and the end of the academic year (summative phase). The period will enable the researchers to monitor the growth and maintenance of transformational leadership impacts on student self-resilience and academic performance in various academic challenges and learning levels. Also, follow-up evaluation of two or more academic years can be conducted annually to identify the longitudinal effects of leadership practices and student resilience on academic persistence and graduation rates as well as post-education outcomes including employment or continued studies. The interventions or resilience-building programs could also be embedded

between measurement points and would permit experimental comparisons and practical policy and practice suggestions.

This research used transformational leadership and self-resilience as primary influences of academic performance but other significant factors should be further analyzed. The model omitted analysis of organizational culture together with individual personality traits as well as additional contextual or technological influences. The development of a full framework requires the integration of new variables found in future research projects.

Additional understanding about student and educator experiences at the individual level can be achieved by utilizing research methods which combine quantitative and qualitative data collection approaches. In order to investigate the ways in which transformational leadership (TL) can contribute to the self-resilience of students, a mixed-methods approach may provide both coverage and depth of knowledge. It is suggested to use a sequential explanatory design, in which quantitative data (e.g., surveys assessing TL behaviors, self-resilience, and academic outcomes) will be gathered first to determine the statistical relations, and then qualitative methods (e.g., semi-structured interviews or focus groups) will be used to describe the underlying processes and individual experiences that determine these relations. As an example, surveys would be based on validated scales such as Multifactor Leadership Questionnaire (MLQ) and academic resilience scales, and follow-up interviews with students and teachers would be used to investigate how certain leadership behaviors, such as individualized support or inspirational motivation, contribute to students overcoming stress, surviving setbacks, and remaining motivated. Also, classroom observations might be used to observe leadership processes in real-time, and student reflective journals might offer longitudinal information on student resilience development. Such triangulation of data not only confirms the results, but also enhances the knowledge on how and why transformational leadership promotes resilience in various learning environments.

ACKNOWLEDGEMENTS

The authors are very grateful to all the people involved in this research particularly Universiti Utara Malaysia who supported this study.

DATA AVAILABILITY

The statistical evidence of this research can be requested by the adequate request to the responsible author.

REFERENCES

1. Feraco T, Resnati D, Fregonese D, Spoto A, Meneghetti C. An integrated model of school students' academic achievement and life satisfaction. Linking soft skills, extracurricular activities, self-regulated learning, motivation, and emotions. European Journal of Psychology of Education. 2023 Mar;38(1):109-30.

2. Robinson VM, Lloyd CA, Rowe KJ. The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. Educational administration quarterly. 2008 Dec;44(5):635-74.

3. Xue E, Li J. Exploring the type-based vocational education system: Insights from China. Educational Philosophy and Theory. 2022 Aug 24;54(10):1670-80.

4. Han Y, Ni R, Deng Y, Zhu Y. Supply and demand of higher vocational education in China: Comprehensive evaluation and geographical representation from the perspective of educational equality. Plos one. 2023 Oct 19;18(10): e0293132.

5. Liu S, Hardy I. Understanding Chinese national vocational education reform: a critical policy analysis. Journal of Vocational Education & Training. 2023 Oct 20;75(5):1055-77.

6. Hardy I, Liu S. Complex connectivities: Policy networks, data infrastructures and vocational education reform in China. International Journal of Educational Research. 2022 Jan 1; 115:102045.

7. Wang G, Wang Z. Vocational education: a poor second choice? A comparison of the labour market outcomes of academic and vocational graduates in China. Oxford review of education. 2023 May 4;49(3):408-27.

8. Marimuthu NV, Chethiyar SD, Arshad MZ, Devarajah K, Damodaran YK, Arshad MA. Factors Effecting on Work Values Towards Career Choices Among University Students. InThe Global Conference on Entrepreneurship and the Economy in an Era of Uncertainty 2023 Nov 15 (pp. 765-788). Singapore: Springer Nature Singapore.

9. Qi W, Zhang Y, Arshad MZ. Sustainable education in action: Principal leadership, teacher wellbeing, and altruism in the sports context. Acta Psychologica. 2025 Apr 1; 254:104846.

10. Bass BM, Bass Bernard M. Leadership and performance beyond expectations. New York: Free press; 1985 May.

11. Khan ML, Salleh R, Javaid MU, Arshad MZ, Saleem MS, Younas S. Managing butterfly career attitudes: The moderating interplay of organisational career management. Sustainability. 2023 Mar 14;15(6):5099.

12. Antera S. Being a vocational teacher in Sweden: Navigating the regime of competence for vocational teachers. International Journal for Research in Vocational Education and Training (IJRVET). 2022;9(2):269-93.

13. Wang Y, Arshad MZ, Arshad D. Proactive eco-initiatives in healthcare: Exploring the role of motivation, organizational culture, and leadership. Acta Psychologica. 2025 May 1; 255:104921.

14. Arshad MZ, Arshad D. Intellectual capital and SMEs performance in Pakistan: The role of environmental turbulence. International Journal of Entrepreneurship. 2018.

15. Khan WA, Hassan RA, Arshad MZ, Kashif U. Does innovation affect the firm performance in developing countries? A conceptual framework. Jurnal Pengurusan. 2020; 59:117-27.

16. Fiorilli C, Benevene P, De Stasio S, Buonomo I, Romano L, Pepe A, Addimando L. Teachers' burnout: The role of trait emotional intelligence and social support. Frontiers in psychology. 2019 Dec 10;10:2743.

17. Ossiannilsson ES. Resilient agile education for lifelong learning post-pandemic to meet the United Nations sustainability goals. Sustainability. 2022 Aug 20;14(16):10376.

18. Awais A, Fu N, Jones S. Developing students' resilience during the crisis: A moderated model linking college support, study demands, student resilience, and students' change-oriented behaviours. Higher Education Quarterly. 2024 Jul;78(3):565-85.

19. Burns JM. Leadership and followership. Leadership. 1978; 18:18-23.

20. Lim, J., & Moon, K. K. (2024). The Effect of Emotional Labor on Psychological Well-Being in the Context of South Korean Firefighters: The Moderating Role of Transformational Leadership. Behavioral Sciences, 14(3), 167.

21. Rayburn SW, Anderson S, Sierra JJ. Future thinking continuity of learning in marketing: A student perspective on crisis management in higher education. Marketing Education Review. 2021 Jul 3;31(3):241-55.

22. Liu C, Ahmad N, Jiang M, Arshad MZ. Steering the path to safer food: The role of transformational leadership in food services to combat against foodborne illness. Journal of Retailing and Consumer Services. 2024 Nov 1; 81:103958.

23. Caena F, Vuorikari R. Teacher learning and innovative professional development through the lens of the Personal, Social and Learning to Learn European key competence. European Journal of Teacher Education. 2022 Aug 8;45(4):456-75.

24. Deci EL, Ryan RM. The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. Psychological inquiry. 2000 Oct 1;11(4):227-68.

25. Bittmann F. When problems just bounce back: about the relation between resilience and academic success in German tertiary education. SN social Sciences. 2021 Feb 15;1(2):65.

26. Qi C, Yang N. An examination of the effects of family, school, and community resilience on high school students' resilience in China. Frontiers in Psychology. 2024 Jan 11; 14:1279577.

27. Jiang R. The mediating role of emotional intelligence between self-efficacy and resilience in Chinese secondary vocational students. Frontiers in Psychiatry. 2024 Jul 9; 15:1382881.

28. Liu C, Jiang M, Muhammad ZA. The impact of TikTok short video factors on tourists' behavioral intention among Generation Z and Millennials: The role of flow experience. Plos one. 2024 Dec 5;19(12): e0315140.

29. Herkama S, Kontio M, Sainio M, Turunen T, Poskiparta E, Salmivalli C. Facilitators and barriers to the sustainability of a school-based bullying prevention program. Prevention science. 2022 Aug;23(6):954-68.

30. Nguyen D, Kleeman NJ, Yager Z, Parker AG, Shean MB, Jefferies W, Wilson-Evered E, Pucinischi CP, Pascoe MC. Identifying barriers and facilitators to implementing mindfulness-based programmes into schools: A mixed methods study. Applied Psychology: Health and Well-Being. 2022 Nov;14(4):1172-88.

31. Vroom V, Porter L, Lawler E. Expectancy theories. In Organizational behavior 1 2015 Mar 26 (pp. 94-113). Routledge.

32. Day C, Gu Q. Resilient teachers, resilient schools: Building and sustaining quality in testing times. Routledge; 2013 Dec 17.

33. Slavich GM, Zimbardo PG. Transformational teaching: Theoretical underpinnings, basic principles, and core methods. Educational psychology review. 2012 Dec;24(4):569-608.

34. Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. Child development. 2000 May;71(3):543-62.

35. Salami, Krumrei-Mancuso EJ, Newton FB, Kim E, Wilcox D. Psychosocial factors predicting first-year college student success. Journal of College Student Development. 2013;54(3):247-66.

36. Sliwka A, Klopsch B, Beigel J, Tung L. Transformational leadership for deeper learning: shaping innovative school practices for enhanced learning. Journal of Educational Administration. 2024 Jan 3;62(1):103-21.

37. Lee DY, Cho JH. Convergence influence of self-resilience, critical thinking, and academic self-efficacy on self-leadership of nursing students. Journal of the Korea Convergence Society. 2018;9(10):561-9.

38. Ashraf F, Zareen G, Yıldırım M. Religious self-regulation, self-determination, resilience, and conflict management strategies in a community sample of international Muslim students in Pakistan. Journal of Religion & Spirituality in Social Work: Social Thought. 2023 Jul 3;42(3):323-45.

39. Martin AJ, Marsh HW. Academic resilience and its psychological and educational correlates: A construct validity approach. Psychology in the Schools. 2006 Mar;43(3):267-81.

40. Nouwen W, Clycq N, Struyf A, Donche V. The role of work-based learning for student engagement in vocational education and training: an application of the self-system model of motivational development. European Journal of Psychology of Education. 2022 Sep;37(3):877-900.

41. Urhahne D, Wijnia L. Theories of motivation in education: An integrative framework. Educational Psychology Review. 2023 Jun;35(2):45.

42. Shin YJ, Kelly KR. Resilience and decision-making strategies as predictors of career decision difficulties. The Career Development Quarterly. 2015 Dec;63(4):291-305.

43. Skinner EA, Kindermann TA, Vollet JW, Rickert NP. Complex social ecologies and the development of academic motivation. Educational Psychology Review. 2022 Dec;34(4):2129-65.

44. Bass BM, Riggio RE. Transformational leadership. Psychology press; 2006 Aug 15.

45. Balwant PT. The meaning of student engagement and disengagement in the classroom context: Lessons from organisational behaviour. Journal of further and higher education. 2018 Apr 3;42(3):389-401.

46. Koh WL, Steers RM, Terborg JR. The effects of transformational leadership on teacher attitudes and student performance in Singapore. Journal of organizational behavior. 1995 Jul;16(4):319-33.

47. Udin U. Transformational leadership and organizational commitment: a review of literature. Journal of research and Opinion. 2020;7(2):2623-6.

48. Trigueros R, Padilla A, Aguilar-Parra JM, Mercader I, López-Liria R, Rocamora P. The influence of transformational teacher leadership on academic motivation and resilience, burnout and academic performance. International journal of environmental research and public health. 2020 Oct;17(20):7687.

49. Rahman NR, Krishnan H, Jamaludin J, Masri R, Mustafa BN. The effect of transformational leadership and students' engagement on academic performances: Does it really matter?'. Journal of Survey in Fisheries Science. 2023;10(4):2682-92.

50. Tanji F, Nanbu H, Ono M, Abe N, Nitta J. The association between resilience and academic performance among nursing students: a cross-sectional study in Japan. Journal of rural medicine. 2021;16(4):206-13.

51. Liu P, Alias BS, Alias BS. Teacher motivation and commitment through transformational leadership in China's vocational schools. Journal of Ecohumanism. 2024;3(4):1771-9.

52. Luthans F, Youssef CM, Avolio BJ. Psychological capital: Developing the human competitive edge. Oxford university press; 2006 Sep 21.

53. Cassidy S. Resilience building in students: The role of academic self-efficacy. Frontiers in psychology. 2015 Nov 27; 6:1781.

54. Martin AJ. Academic buoyancy and academic resilience: Exploring 'everyday'and 'classic'resilience in the face of academic adversity. School Psychology International. 2013 Oct;34(5):488-500.

55. Sattler K, Gershoff E. Thresholds of resilience and within-and cross-domain academic achievement among children in poverty. Early Childhood Research Quarterly. 2019 Jan 1; 46:87-96.

56. Li H. The 'secrets' of Chinese students' academic success: academic resilience among students from highly competitive academic environments. Educational Psychology. 2017 Sep 14;37(8):1001-14.

57. Chen Y, Xie X, Huang CC. Resilience of vocational students with disadvantaged characteristics in China: The role of mindfulness. Children and Youth Services Review. 2021 Mar 1; 122:105917.

58. Trigueros R, Aguilar-Parra JM. Adaptation and testing of the factorial structure of the Achievement Emotional Questionnaire-Short to the Spanish context of physical education classes. European Physical Education Review. 2022 Aug;28(3):777-96.

59. Balwant PT, Birdi K, Stephan U, Topakas A. Transformational instructor-leadership and academic performance: A moderated mediation model of student engagement and structural distance. Journal of Further and Higher Education. 2019 Aug 9;43(7):884-900.

60. Sun Y, Liu L. Structural equation modeling of university students' academic resilience academic well-being, personality and educational attainment in online classes with Tencent Meeting application in China: Investigating the role of student engagement. BMC psychology. 2023 Oct 20;11(1):347.

61. Zeng G, Hou H, Peng K. Effect of growth mindset on school engagement and psychological well-being of Chinese primary and middle school students: The mediating role of resilience. Frontiers in psychology. 2016 Nov 29; 7:1873.

62. Choo, C. S., & Prihadi, K. (2019). Parental attachment and academic motivation: The mediating role of academic resilience. International Journal of Evaluation and Research in Education, 8(4), 563–568.

63. Ahmed U, Umrani WA, Qureshi MA, Samad A. Examining the links between teachers support, academic efficacy, academic resilience, and student engagement in Bahrain. International Journal of Advanced and Applied Sciences. 2018 Jul 4;5(9):39-46.

64. Fang G, Xie M, Zheng C, Wang J. The impact of teacher support on school adaptation among Chinese urban adolescents: a moderated mediation model. BMC Public Health. 2025 Feb 10;25(1):545.

65. Bass BM, Avolio BJ, editors. Improving organizational effectiveness through transformational leadership.

sage; 1994.

66. Smith BW, Dalen J, Wiggins K, Tooley E, Christopher P, Bernard J. The brief resilience scale: assessing the ability to bounce back. International journal of behavioral medicine. 2008 Sep;15(3):194-200.

67. Eccles JS, Wigfield A. Motivational beliefs, values, and goals. Annual review of psychology. 2002 Feb;53(1):109-32.

68. Xu J, Ramayah T, Arshad MZ, Ismail A, Jamal J. Decoding digital dependency: Flow experience and social belonging in short video addiction among middle-aged and elderly Chinese users. Telematics and Informatics. 2025 Jan 1; 96:102222.

69. Meirun T, Bano S, Jafri SK, Arshad MZ, Javaid MU. Career adaptability as protagonist on contemporary rural migrant workers' turnover intention: The mediating effect of organization embeddedness and organizational identification. Work. 2022 Jan 15;71(1):223-34.

70. Masten AS. Ordinary magic: Resilience processes in development. American psychologist. 2001 Mar;56(3):227.

CONFLICTS OF INTEREST

None.

FUNDING

None.

AUTHOR CONTRIBUTIONS

Conceptualization: Hao Yu.
Methodology: Hao Yu.
Formal Analysis: Hao Yu.
Research: Irwan Mahazir bin Ismail.
Data Curation:
Visualisation: Irwan Mahazir bin Ismail
Supervision: Hao Yu.
Project management:
Writing - Original draft: Hao Yu, Irwan Mahazir bin Ismail.
Writing - Proofreading and editing: Irwan Mahazir bin Ismail.