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The Effect of College Students' Self-Efficacy on Learning Gains: The Chain Mediating Role of Learning Attitude and Teaching Evaluation

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Abstract

Based on the triadic reciprocal determinism model of social cognitive theory, this study aims to explore the relationship between college students' self-efficacy and learning gains, with a focus on examining the mediating roles of learning attitude and teaching evaluation. A questionnaire survey was conducted among 886 college students from three universities in Zhejiang Province using the Academic Self-Efficacy Scale, Learning Attitude Scale, Teaching Evaluation Scale, and Learning Gains Scale. The results show that: (1) Self-efficacy has a significant positive direct effect on learning gains ($\beta = 0.443$, $p < 0.001$); (2) Learning attitude partially mediates the association between self-efficacy and learning gains (indirect effect = 0.225, CI [0.084, 0.371]); (3) Teaching evaluation also serves as a partial mediator between the two variables (indirect effect = 0.276, CI [0.218, 0.345]); (4) Learning attitude and teaching evaluation form a chain mediating path between self-efficacy and learning gains. Specifically, self-efficacy influences teaching evaluation through learning attitude, which in turn affects learning gains (indirect effect = 0.080, CI [0.041, 0.157]). This study reveals multiple psychological pathways through which self-efficacy affects learning gains. It provides theoretical references for understanding the mechanism underlying college students' learning gains and offers empirical evidence for universities to improve talent cultivation quality and optimize teaching practices.

Keywords

self-efficacy; learning gains; learning attitude; teaching evaluation; chain mediation

1 Introduction

Students' acquisition of effective learning outcomes is a research issue worthy of in-depth exploration. As a subjective experience of the learning process and outcomes, learning gains constitute a pivotal psychological variable that cannot be overlooked in research on higher education quality.

The triadic reciprocal determinism model of social cognitive theory posits that individual behavior is

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determined by the dynamic interaction of personal factors, behavioral factors, and environmental conditions, among which individual cognitive factors serve as the core element. Self-efficacy is a concentrated embodiment of such core cognitive motivation. It not only directly affects students' learning engagement and academic achievement but also profoundly shapes the quality of their overall learning experience. As a deep-seated psychological structure, learning attitude exerts a regulatory effect on the direction and depth of cognitive processing, and imposes fundamental pervasive and guiding influences on the learning process. Students with high self-efficacy are more likely to develop positive learning attitudes, thereby actively engaging in cognitive activities and improving their learning gains. Students' teaching evaluation serves as both a diagnosis of their own cognitive processes and learning behaviors and an assessment of teachers' teaching content and methods, which fully reflects students' subjectivity. The generative mechanism of students' learning gains is jointly shaped by the drive of cognitive beliefs, the choice of behavioral attitudes, and reflections on teaching practices. Based on social cognitive theory, this study aims to explore the relationship between self-efficacy and learning gains, and focus on analyzing the influencing roles of learning attitude and teaching evaluation in this relationship, so as to provide a new perspective for understanding the connection between educational environment and student development.

2 Theoretical Background and Hypotheses

2.1 Self-Efficacy

Self-efficacy was proposed by the American psychologist Bandura in the 1970s. It refers to individuals' subjective judgment and confidence in their capability to perform and achieve established goals, and plays a vital role in regulating human behavior[1]. Before engaging in a certain behavior, individuals evaluate their own capabilities, including the efforts to be invested, perseverance to overcome difficulties, and potential outcomes. Self-efficacy represents an evolving capacity to make anticipatory judgments about one's own competence.

Self-efficacy serves as a critical predictor that directly affects college students' learning outcomes. Students with high self-efficacy tend to hold positive perceptions of their academic abilities, possess higher academic aspirations, and devote more time and energy to learning activities, thereby achieving favorable learning outcomes[2]. In contrast, students with low self-efficacy are prone to developing negative academic perceptions and lack sufficient psychological resilience and persistence when confronted with setbacks. Numerous empirical studies have demonstrated a positive correlation between self-efficacy and academic effort; students high in self-efficacy are more inclined to invest greater efforts in their academic pursuits[3].

2.2 Perceived Learning Outcomes

As a localized concept, the sense of gain was initially applied to the field of reform and development to characterize people's subjective experiences in material and spiritual life. With the advancement of research, this concept has gradually expanded to economics, politics, culture and other fields, and evolved into a generally applicable evaluation criterion. In higher education, the sense of gain has become an important indicator for measuring the quality of talent cultivation in universities. For college students, it refers to their comprehensive evaluation of their own learning process and learning effectiveness.

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Perceived learning outcomes denote college students' positive psychological experience and sense of satisfaction in knowledge accumulation, skill acquisition and competence development through active learning and practical application[4]. This concept addresses the limitation of separation between objective indicators (e.g., academic performance and employment rate) and subjective indicators in traditional higher education evaluation systems, and can better reflect the matching degree between educational supply and student needs. In terms of measurement dimensions, some scholars examine college students' material gains and emotional satisfaction in learning from four aspects: recognition, satisfaction, participation opportunities and achievement levels[5]. Other studies analyze the psychological structure of perceived learning outcomes from four dimensions: sense of resource availability, self-improvement, positive emotional experience, and sense of achievement[6].

2.3 The Relationship between Self-Efficacy and Perceived Learning Outcomes

Scholarly discussions on the relationship between these two variables have mostly focused on the association between self-efficacy and positive emotional experiences, and research findings remain inconsistent. Caprara et al. indicated that individuals with high self-efficacy experience more positive affect compared with those with low self-efficacy[7], a finding supported by domestic studies. For instance, Yan Dongli et al. found that students with higher self-efficacy are more courageous in tackling academic challenges, demonstrating confidence in their abilities and enthusiasm for learning. In contrast, individuals with low self-efficacy tend to doubt their chances of success and are prone to negative emotions[8]. Nevertheless, some scholars, in a joint investigation of college students' academic engagement and self-efficacy on knowledge-related perceived learning outcomes, found that the direct positive predictive effect of academic self-efficacy on knowledge gains is relatively weak[9]. The above studies suggest that whether self-efficacy exerts a stable direct effect on perceived learning outcomes, or functions indirectly through other variables, remains to be further examined. Accordingly, this study puts forward the following hypothesis:

H1: Self-efficacy has a direct positive effect on perceived learning outcomes.

2.4 The Mediating Role of Learning Attitude

Attitude constitutes an important research topic in psychology. Learning attitude refers to a relatively stable and selective response tendency formed by individuals in learning activities[10], which affects students' cognitive evaluation, emotional experience and behavioral readiness. Theoretically, a positive learning attitude can sustain the directional guarantee of learning motivation, strengthen individuals' psychological resilience in coping with academic difficulties, facilitate continuous academic development and the construction of higher-order cognitive strategies, and determine the depth, breadth and durability of learning experiences. Empirically, existing studies have shown that learning attitude can promote or hinder learners' thinking and learning potential, thereby influencing academic performance and learning effectiveness[11]; positive learning attitude can significantly improve learning outcomes and is directly associated with classroom behaviors and academic achievement[12]. Specifically, self-efficacy may shape individuals' positive or negative attitudes toward learning activities and further affect their perceived learning outcomes. Accordingly, this study proposes the following hypothesis:

H2: Learning attitude mediates the relationship between self-efficacy and perceived learning outcomes.

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2.5 The Mediating Role of Teaching Evaluation

Teaching evaluation in this paper refers to students' subjective assessment of teachers' teaching content, teaching methods, teaching competence and other related dimensions. This process not only embodies students' subjectivity and meaning construction, but also shapes their existing academic self-efficacy orientation. When students hold positive evaluations of the content delivered and pedagogical approaches adopted by teachers, they tend to shift from passive reception to active scrutiny, achieving deep internalization and value recognition of knowledge. The efficacy beliefs generated from such self-assessment constitute the internal driving force of perceived learning outcomes. An empirical study on learning enjoyment found that teachers' instructional competence is significantly positively correlated with students' subjective learning experience, and students' active engagement and self-perception of acquired skills are critical predictors of learning enjoyment[13]. Accordingly, this study puts forward the following hypothesis:

H3: Teaching evaluation mediates the relationship between self-efficacy and perceived learning outcomes.

2.6 The Chain Mediating Role of Learning Attitude and Teaching Evaluation

Scholars have not yet established a clear and complete explanatory pathway regarding how self-efficacy affects perceived learning outcomes through learners' psychological processes. Both learning attitude and teaching evaluation are likely to mediate the relationship between self-efficacy and perceived learning outcomes. Moreover, learning attitude may exert an influence on teaching evaluation. When students maintain active engagement and thoughtful reflection in classroom teaching, their judgments of teaching content and instructional methods rest on a more rational basis, and their evaluations become more referable. Accordingly, the following hypothesis is proposed:

H4: Learning attitude and teaching evaluation exert a chain mediating effect between self-efficacy and perceived learning outcomes.

In summary, to further explore the internal mechanism underlying the relationship between college students' academic self-efficacy and perceived learning outcomes, this study constructs a theoretical model with learning attitude and teaching evaluation as chain mediating variables. Specifically, self-efficacy not only exerts a direct effect on perceived learning outcomes but also indirectly influences them through multiple pathways.

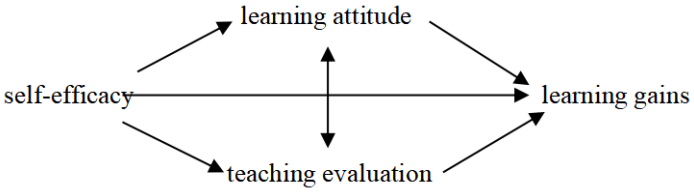


Figure 1 Theoretical Hypothetical Model

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3 Research Subjects and Methods

3.1 Research Subjects

Three universities in Zhejiang Province were selected. With the integration of Xi Jinping Cultural Thought into ideological and political teaching as the carrier, cluster sampling was conducted on a class basis to cover college students from diverse disciplinary backgrounds as much as possible. A total of 900 paper questionnaires were distributed. Students received on-site guidance during filling, and 894 questionnaires were collected immediately, with a response rate of 99.3%. After excluding invalid questionnaires with regular response patterns and missing items, 886 valid questionnaires were retained, yielding an effective response rate of 98.4%.

3.2 Research Instruments

3.2.1 Self-Efficacy Questionnaire

The Academic Self-Efficacy Scale developed by Liang Yusong was adopted[14]. Combined with the teaching content, the scale was revised to 8 items. A 5-point Likert scale was used, where 1 indicates strongly disagree and 5 indicates strongly agree. Higher scores represent greater self-efficacy. The Cronbach's α coefficient of the revised scale was 0.843.

3.2.2 Learning Attitude Questionnaire

This study revised the content of the College Students' Ideological and Political Course Learning Attitude Questionnaire compiled by Du Tiantian[15]. The revised questionnaire consists of 7 items with a 5-point Likert scale. Higher scores indicate more positive learning attitudes among students. The Cronbach's α coefficient of the revised questionnaire was 0.826.

3.2.3 Teaching Evaluation Questionnaire

Drawing on the competency model for university ideological and political course teachers in the new era constructed by Hao Tao[16], this questionnaire asks students to subjectively evaluate teachers from dimensions including political literacy, curriculum content, and teaching methods. It contains 7 items with a 5-point Likert scale. Higher scores indicate greater student recognition of teachers' teaching. The Cronbach's α coefficient of the questionnaire was 0.813.

3.2.4 Perceived Learning Outcomes Questionnaire

The Questionnaire on College Students' Sense of Gain in Ideological and Political Courses developed by Yang Jing originally contains 19 items covering four dimensions: cognitive dimension, psychological dimension and behavioral dimension[17]. In accordance with the research context of this study, 10 items were selected and revised. A 5-point Likert scale was adopted. The total score of all items reflects the level of college students' perceived learning outcomes. The Cronbach's α coefficient of the questionnaire was 0.932.

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3.3 Data Analysis

SPSS 24.0 software was used to conduct descriptive statistics, correlation analysis, reliability test and common method bias test for the main variables. Mplus 8.3 software was adopted to test the mediating effect model[18].

4 Results

4.1 Common Method Bias Test

Since data of all variables in this study were collected from college students' self-reports, common method bias may exist. Harman's single-factor test was adopted for statistical assessment. The results of unrotated exploratory factor analysis extracted six factors with eigenvalues greater than 1. The explained variance of the first factor was 22.089%, which was below the critical cutoff value of 40%. This indicates that there is no serious common method bias in this study.

4.2 Descriptive Statistics and Correlation Analysis

Descriptive statistics and correlation analysis were performed on four variables, namely academic self-efficacy, learning attitude, teaching evaluation and perceived learning outcomes, based on data from 886 college students. The means, standard deviations and correlation coefficients of each variable are shown in Table 1. The results revealed significant pairwise positive correlations among the four variables, with correlation coefficients ranging from 0.571 to 0.745 ($p < 0.01$). These findings provide a necessary prerequisite for the subsequent mediating effect test.

Table 1 Descriptive Statistics and Correlation Analysis of All Variables（$n=886$）

	Self efficacy	learning attitude	teaching evaluation	Learning gains
self-efficacy	1			
Learning attitude	0.745**	1		
teaching evaluation	0.587**	0.610**	1	
learning gains	0.593**	0.571**	0.641**	1
Mean（M）	3.64	3.62	3.93	4.28
Standard Deviation（SD）	0.81	0.88	0.91	0.71

4.3 Test of the Mediating Effect of Learning Attitude

Based on the results of correlation analysis, Mplus 8.3 software was used to construct a structural equation model to examine the mediating effect of learning attitude between self-efficacy and perceived learning outcomes. After controlling for demographic variables such as gender, grade and major, the bias-corrected Bootstrap method with 5000 resamples was adopted to generate confidence intervals. The results showed that the factor loadings of all measurement indicators were statistically significant ($p < 0.001$), and the standardized factor loadings were all above 0.70, indicating that the measurement model possessed good construct validity. The R^2values of items for learning attitude ranged from 0.571 to 0.660; the R^2values of items for self-efficacy

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ranged from 0.490 to 0.673; the R^2values of items for perceived learning outcomes ranged from 0.549 to 0.749. These findings suggest that the observed variables can effectively reflect the latent variables.

As shown in Table 2, self-efficacy exerted a significant direct effect on perceived learning outcomes (β = 0.443, p < 0.001), with the 95% confidence interval of [0.271, 0.617]. Since the confidence interval did not contain zero, Hypothesis 1 was supported.

The results of mediating effect test revealed that self-efficacy had a significant direct effect on learning attitude (β = 0.871, p < 0.001), and self-efficacy explained 75.8% of the variance in learning attitude. Learning attitude exerted a significant direct effect on perceived learning outcomes (β = 0.282, p < 0.001). The indirect effect of self-efficacy on perceived learning outcomes via learning attitude was 0.225, with a 95% confidence interval of [0.084, 0.371]. The confidence interval excluded zero, indicating a significant indirect effect. Since both the direct and indirect effects were significant and in the same direction, learning attitude played a partial mediating role between self-efficacy and perceived learning outcomes. Hypothesis 2 was supported.

Table 2 Standardized Path Coefficients and Effect Decomposition for Learning Attitude

Type of Effect	Path / effect	β	S.E.	t	95% CI
Direct effect	self-efficacy→learning attitude	0.871	0.019	45.768	[0.831，0.906]
	self-efficacy→ learning gains	0.443	0.088	5.028	[0.271，0.617]
	learning attitude→learning gains	0.282	0.09	3.135	[0.103，0.458]
Indirect effect	self-efficacy→learning attitude→ learning gains	0.225	0.072	3.112	[0.084，0.371]
Total effect	self-efficacy→learning gains	0.630	0.035	17.792	[0.564，0.701]

4.4 Test of the Mediating Effect of Teaching Evaluation

A mediating model was constructed with teaching evaluation as the mediating variable, self-efficacy as the independent variable, and perceived learning outcomes as the dependent variable. The model fit indices were as follows: χ^2/df= 6.62, CFI = 0.948, TLI = 0.937, RMSEA = 0.080, 90% CI = [0.074, 0.085], SRMR = 0.036. Both CFI and TLI were greater than 0.90, SRMR was less than 0.08, and RMSEA was close to the cutoff value of 0.08, indicating good model fit. As shown in the figure below, self-efficacy exerted a significant direct effect on teaching evaluation (β = 0.650, p < 0.001), and teaching evaluation had a significant direct effect on perceived learning outcomes (β = 0.452, p < 0.001). Meanwhile, self-efficacy also had a significant direct effect on perceived learning outcomes (β = 0.396, p < 0.001). The indirect effect of self-efficacy on perceived learning outcomes via teaching evaluation was 0.276, with a 95% confidence interval of [0.218, 0.345]. The confidence interval excluded zero, which suggested that teaching evaluation played a partial mediating role between self-efficacy and perceived learning outcomes. Hypothesis 3 was supported.

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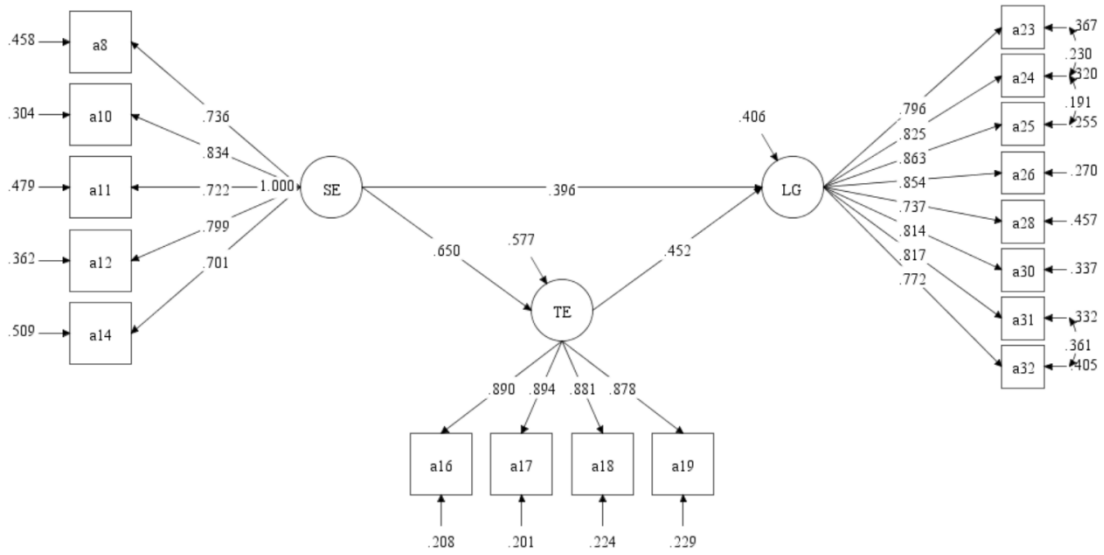


Figure 2 Mediating Effect Diagram of Teaching Evaluation

Note：*SE= self-efficacy; TE= teaching evaluation; LG= learning gains*

4.5 The Chain Mediating Effect of Learning Attitude and Teaching Evaluation

A structural model was constructed with self-efficacy as the independent variable, perceived learning outcomes as the dependent variable, and learning attitude and teaching evaluation as mediating variables. The results are presented in Table 3. All fit indices met good criteria (CFI/TLI > 0.90, RMSEA < 0.08, SRMR < 0.08), indicating that the model fitted the data well.

Table 3 Fit Indices of the Integrated Model

Fit Indices	χ^2	df	χ^2/df	CFI	TLI	RMSEA [90% CI]	SRMR
Model Value	977.83	179	5.46	0.947	0.938	0.071 [0.067, 0.075]	0.036

As shown in the structural model diagram, self-efficacy exerted significant positive effects on learning attitude ($\beta = 0.805$, $p < 0.001$) and teaching evaluation ($\beta = 0.443$, $p < 0.001$). Both self-efficacy ($\beta = 0.400$, $p < 0.001$) and teaching evaluation ($\beta = 0.450$, $p < 0.001$) significantly positively predicted perceived learning outcomes. The indirect effect of self-efficacy on perceived learning outcomes via teaching evaluation was 0.184, with a 95% confidence interval of [0.121, 0.256]. The confidence interval excluded zero, indicating a significant mediating effect of teaching evaluation. However, in the integrated model, the effect of self-efficacy on perceived learning outcomes through learning attitude was not significant ($p > 0.05$).

The study also revealed a bidirectional facilitative relationship between the two mediating variables. Learning attitude exerted a significant positive effect on teaching evaluation ($\beta = 0.239$, $p < 0.001$). Meanwhile, teaching evaluation had a weak but significant positive effect on learning attitude ($\beta = 0.102$, $p < 0.05$). Accordingly, the serial path through which self-efficacy affects perceived learning outcomes via learning attitude and teaching evaluation was: self-efficacy → learning attitude → teaching evaluation → perceived learning outcomes. The indirect effect was 0.080, with a 95% confidence interval of [0.041, 0.157]. The confidence interval excluded zero, demonstrating a significant serial mediating effect. Hypothesis 4 was supported.

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The results indicated that the effect of self-efficacy on perceived learning outcomes operated mainly through two paths: one was the independent mediation of teaching evaluation, and the other was the serial mediation via learning attitude affecting teaching evaluation.

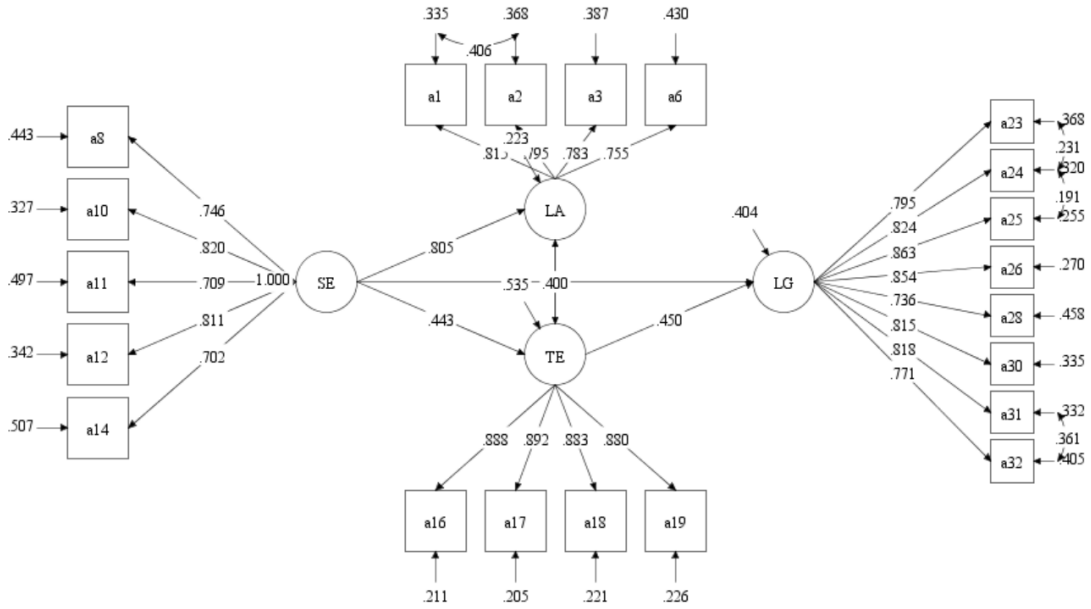


Figure 3 Serial Mediating Effect Diagram

Note：*SE= self-efficacy; LA= learning attitude; TE= teaching evaluation; LG= learning gains*

5 Discussion and Analysis

5.1 Direct Effect of Self-efficacy on Perceived Learning Outcomes

The present study found that self-efficacy exerted a significant positive direct effect on perceived learning outcomes ($\beta = 0.443$, $p < 0.001$). This finding is consistent with the conclusions of Kryshko et al. (2022)[19] and Tao et al. (2019)[20], indicating that college students' beliefs in their capacity to accomplish learning tasks shape their perceptions of learning gains. A possible explanation is that students with high self-efficacy develop mental representations of competence in their minds. Such representations do not rely on external feedback such as scores or teacher praise; instead, they are internalized recognition of the growth of one's own abilities. From the perspective of metacognitive ability, students with high self-efficacy are better at detecting minor personal progress and are more inclined toward self-affirmation. They can keenly perceive the belief that "I believe I can achieve it". This positive feedback at the metacognitive level strengthens college students' subjective experience of gaining knowledge through learning.

5.2 Mediating Role of Learning Attitude

The results revealed that self-efficacy affects perceived learning outcomes via two paths: one is the direct effect of self-efficacy on perceived learning outcomes, and the other is the indirect effect mediated by learning

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attitude (95% CI = [0.084, 0.371]). This finding aligns with the research of Li & Feng (2023)[21]. Moskotina (2025)[22] also confirmed that self-efficacy significantly and positively predicts learning effort and learning engagement, which are external manifestations of positive learning attitudes and partly support the present findings. College students with high self-efficacy tend to regard ideological and political courses as a primary way to improve their theoretical attainment and strengthen their convictions, and such perceptions shape their attitudes during learning. Once students develop a proper learning attitude, it further drives behavioral engagement, including attending classes on time, participating in classroom discussions, finishing assignments conscientiously, and actively consulting relevant materials. These learning behaviors driven by positive attitudes effectively facilitate the acquisition of theoretical knowledge and the improvement of practical abilities, enabling students to experience perceived learning outcomes.

5.3 Mediating Role of Teaching Evaluation

The results of this study show that teaching evaluation plays a partial mediating role between self-efficacy and perceived learning outcomes, with an indirect effect value of 0.276. This finding indicates that college students with high self-efficacy are more likely to perceive teachers' instructional efforts, strengthen their recognition of the learning value of ideological and political courses, and thereby form positive evaluations of teachers. In other words, college students with high self-efficacy listen carefully, think actively, and interact with teachers in class, which leads them to hold positive evaluations of teaching. Such active participation evokes positive feedback from teachers, and students translate this experience into higher evaluations of teachers' instruction, forming a virtuous cycle. He and Wen (2025)[23] also verified that students' perceptions of external instructional support affect learning engagement and gains by activating internal psychological mechanisms such as self-efficacy. It can thus be seen that positive teaching evaluations not only reflect students' recognition of teachers' instruction, but also embody trust in teachers, a sense of belonging to the classroom, and satisfaction with the learning process.

5.4 Role of Serial Mediation

In the integrated model, the positive predictive effect of self-efficacy on perceived learning outcomes via teaching evaluation was significant, with an indirect effect of 0.184, whereas the indirect effect of self-efficacy on perceived learning outcomes through learning attitude was non-significant. The serial mediating path of self-efficacy → learning attitude → teaching evaluation → perceived learning outcomes was significant, with an indirect effect of 0.080. A bidirectional facilitative relationship existed between the two mediating variables: learning attitude exerted a significant positive effect on teaching evaluation ($\beta = 0.239$, $p = 0.001$), and teaching evaluation had a weakly significant positive effect on learning attitude ($\beta = 0.102$, $p = 0.011$). This suggests that in the teaching context of ideological and political courses in universities, college students' evaluations of teachers' teaching serve as a critical source of their perceived learning outcomes. Students' acceptance and internalization of curriculum content largely depend on positive evaluations of teachers' instructional competence, teaching investment and classroom delivery. As a relatively implicit cognitive and affective disposition, learning attitude provides cognitive preparation for this evaluative process.

The integrated model demonstrates that the influence of self-efficacy on perceived learning outcomes is a complex process characterized by the synergy of multiple variables and intertwined paths. Future research

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may further explore other potential variables to analyze this psychological mechanism more comprehensively.

6 Suggestions

Based on the research findings and foregoing discussion, the following suggestions are proposed to promote college students' perceived learning outcomes:

Boost college students' self-efficacy. To begin with, teachers should fully grasp and analyze students' learning conditions, accomplish the dual transformation from textbook system to teaching system and from knowledge system to belief system, and endeavor to resonate with college students' theoretical interests. Secondly, college students are supposed to reflect and summarize proactively so as to gain continuous affirmation and recognition of their own learning competence. Thirdly, through practical teaching, students can go into and engage with society, consciously foster the conviction to shoulder the missions of the times, and motivate themselves to forge ahead.

Cultivate college students' positive learning attitudes. First, teachers should stimulate students' learning expectations and help them discover that ideological and political courses are both "engaging" and "meaningful". Second, teachers may increase interaction and communication with students in class to raise student engagement and encourage active and efficient learning. Third, college students themselves should develop positive learning experiences, translate such experiences into sustainable learning behaviors, achieve the transition from "genuine learning" to "genuine belief", and shift from surface learning to deep learning.

Promote high-quality teaching by teachers. First, teachers should carefully prepare teaching content, endow classrooms with appeal and penetrating power, so as to evoke emotional resonance, conceptual awakening and the germination of faith among students[24]. Second, teachers need to build sound teacher-student relationships with students and realize the equal integration of teaching and learning through sincere respect and care. Third, classroom atmosphere, teacher charisma and other factors subtly shape students' value judgments, which constitute indispensable dimensions of high-quality teaching.

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