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The Influence of Academic Emotions and Learning Strategies on Academic Self-Efficacy among College Students in Guangxi, China

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Abstract

Academic emotions, learning strategies, and academic self-efficacy serve as key factors in learning processes. To examine the impact of academic emotions and learning strategies on academic self-efficacy, a survey was conducted among 383 college students in Guangxi using validated scales measuring these three constructs. Data analysis via SPSS 19.0 included correlation and hierarchical regression analyses, yielding the following findings: 1.Self-efficacy levels and group differences.Students exhibited moderately high academic self-efficacy overall. Significant variations emerged across gender and disciplines, with male students reporting higher self-efficacy than females, and science/engineering majors demonstrating stronger self-efficacy than liberal arts students. 2.Positive emotion correlation.A significant positive correlation existed between positive academic emotions and self-efficacy. Increased experience of positive emotions consistently predicted enhanced self-efficacy. 3.Learning strategy effects.Strategic diversity—particularly in cognitive and emotional strategy application—positively influenced self-efficacy. Students employing varied strategies displayed greater confidence in their academic capabilities.

Keywords: Academic Emotions, Learning Strategies, Academic Self-efficacy, College Students

Introduction

Academic self-efficacy is a concept derived from Bandura's social cognitive theory that involves an individual's belief that he or she can perform the actions necessary to achieve a specific performance goal (Bandura, 1997). This belief significantly affects students' motivation, learning strategies and academic performance. High self-efficacy enhances students' commitment to goals, makes them more resilient in the face of setbacks, and enhances overall academic achievement. Conversely, low self-efficacy may lead to avoidance

of challenging tasks, reduced effort, and decreased academic performance (Schunk, 1991). In an educational context, cultivating academic self-efficacy is critical to student success because it not only affects academic outcomes, but also contributes to students' emotional and psychological well-being.

Academic emotions are emotions that students experience in an educational setting, and they play a crucial role in the learning process (Pekrun, 2006). These emotions can be divided into positive emotions (e.g., enjoyment, hope, pride) and negative emotions (e.g., anxiety, boredom, frustration). Positive academic emotions are associated with increased motivation, increased engagement, and enhanced cognitive processing, which in turn promotes higher academic achievement. For example, students who enjoy learning are more likely to put in effort and persevere in the face of challenges. On the other hand, negative academic emotions can hinder learning by consuming cognitive resources, reducing motivation, and triggering avoidance behaviors (Pekrun et al., 2002).

The relationship between academic emotion and academic self-efficacy is two-way. Positive emotions can enhance self-efficacy by providing a sense of accomplishment and confidence in one's own abilities. Conversely, negative emotions may undermine self-efficacy by highlighting perceived inadequacies and failures. Understanding how academic emotions affect self-efficacy can help educators create supportive learning environments that promote positive emotional experiences and mitigate the effects of negative emotions.

Learning strategies are specific approaches or techniques that students employ to facilitate the acquisition, processing, and retention of information. These strategies are typically divided into cognitive, metacognitive, and affective strategies (Pintrich, 2000). Cognitive strategies involve direct manipulation of the learning material, such as summarization, elaboration, and organization. Metacognitive strategies involve planning, monitoring, and evaluating one's own learning process. Affective strategies involve managing emotions, sustaining motivation, and maintaining a positive attitude towards learning.

Effective use of learning strategies is linked to higher academic performance and stronger academic self-efficacy. Students who utilize a broad range of strategies are better equipped to handle academic challenges and adapt to different learning contexts. For instance, metacognitive strategies enable students to assess their understanding and adjust their study methods accordingly, which can enhance their sense of control and competence. Affective strategies help students manage stress and maintain motivation, further reinforcing their belief in their academic capabilities.

China's educational system is characterized by its competitiveness and exam-oriented nature, placing considerable pressure on students to perform well academically. This environment can significantly influence students' academic emotions and self-efficacy. The focus on high-stakes examinations often leads to high levels of academic stress and anxiety, which can negatively affect students' emotional well-being and self-efficacy. However, the same competitive environment can also foster a strong sense of determination and resilience among students who manage to navigate the pressures successfully (Zheng & Zhao,2023).

Guangxi, an autonomous region in southern China, presents a unique context for studying these phenomena. Known for its cultural diversity and relatively lower economic development compared to coastal regions, Guangxi provides a distinctive backdrop for exploring the interplay between academic emotions, learning strategies, and self-efficacy. Understanding these dynamics in Guangxi can offer insights into how regional and cultural factors influence students' academic experiences and outcomes. (Hu & Gao,2022).

Existing research highlights the significant roles that academic emotions and learning strategies play in shaping academic self-efficacy. For instance, Pekrun et al. (2002) found that positive academic emotions such as enjoyment and pride are positively correlated with academic self-efficacy, while negative emotions like anxiety and boredom are negatively correlated. Similarly, studies by Pintrich (2000) and Schunk (1991) emphasize the importance of effective learning strategies in enhancing self-efficacy and academic performance.

However, most of the existing literature focuses on Western contexts, with relatively few studies examining these relationships in Chinese educational settings. Given the unique cultural and educational environment in China, there is a need for research that specifically addresses how academic emotions and learning strategies influence self-efficacy among Chinese students.

Literature Review

Academic self-efficacy, as a core construct of self-regulated learning theory, was proposed and defined by Bandura as “an individual's belief in their ability to complete specific learning tasks.” This belief in ability is not the actual ability itself, but rather an individual's assessment and judgment of their own capabilities, directly influencing students' learning motivation, goal setting, and persistence (Zhao, 2024). In educational practice, academic self-efficacy is formed and developed through four key sources: direct experience, verbal persuasion, and physiological and emotional states. Among these, successfully completing challenging tasks significantly reinforces students' beliefs in their abilities, while repeated failures can lead to self-doubt.

From a mechanistic perspective, students with high academic self-efficacy exhibit stronger goal commitment and higher willingness to take on challenges. Research shows that such students tend to choose more difficult learning tasks, demonstrate greater resilience when encountering difficulties, and are more adept at using metacognitive strategies to monitor and adjust their learning processes (Zheng, 2023). Taking mathematics as an example, students with high self-efficacy are more willing to try multiple problem-solving methods when faced with difficult problems, while those with low self-efficacy are more likely to exhibit avoidance behavior. This difference ultimately manifests in academic achievement: multiple empirical studies have shown a significant positive correlation between academic self-efficacy and academic performance, and this correlation remains stable across different educational stages. Notably, academic self-efficacy exhibits significant group differences. In terms of gender, males generally exhibit higher self-efficacy in math and science subjects than females, while the opposite trend is observed in language subjects. From a disciplinary perspective, science and engineering students exhibit significantly higher overall self-efficacy than liberal arts students, which may be related to disciplinary thinking paradigms and social expectation effects (Chen, 2024). Additionally, longitudinal studies indicate that academic

self-efficacy undergoes dynamic changes as students progress through their academic years: first-year students experience fluctuations in self-efficacy due to environmental adaptation challenges, second-year students see a decline in self-efficacy due to increased academic difficulty, while upperclassmen rebuild confidence through enhanced professional competence (Pan & Zhao,2024).

Positive academic emotions and self-efficacy exhibit a bidirectional reinforcing mechanism. On one hand, positive emotions indirectly reinforce ability beliefs by expanding cognitive resources and enhancing learning motivation. When students are in a pleasant state, their attention span is broader, creative thinking is more active, and they are more willing to try advanced learning strategies. These factors collectively enhance learning efficiency, thereby validating and reinforcing self-efficacy. Research shows that students who enjoy the learning process score an average of 34% higher on self-efficacy scales than those with negative emotions (Zeng, 2022). On the other hand, self-efficacy itself also promotes the generation of positive emotions: students with high self-efficacy have stronger expectations of control over learning tasks, and these expectations reduce anxiety caused by uncertainty, making it easier for them to experience the joy of learning. This positive feedback loop effect has been validated in a sample of college students in Guangxi: the correlation coefficient between positive high-arousal emotions and self-efficacy reached r = 0.333, while the correlation was even higher for positive low-arousal emotions (Zhao, 2024).

The impact of negative academic emotions on self-efficacy exhibits differentiated characteristics. While high arousal negative emotions directly impair learning efficiency, moderate anxiety may produce a motivational arousal effect, prompting students to increase their learning investment and thereby indirectly maintain self-efficacy. Research shows that anxiety is weakly negatively correlated with self-efficacy, and this association is weakest among students with average grades (Xue, 2023). Low-arousal negative emotions, however, have a significant erosive effect on self-efficacy. Notably, emotional intelligence plays a key buffering role in this process: students with high trait emotional intelligence can effectively identify and regulate negative emotions, blocking their negative impact on self-efficacy.

Learning strategies are systematic methods that learners adopt to achieve learning goals. According to Biggs' 3P model, they can be divided into three categories: surface strategies, deep strategies, and achievement strategies. These strategies influence academic self-efficacy through different mediating pathways, forming a diverse mechanism of action.

Deep learning strategies have a significant positive correlation with self-efficacy. When students employ deep strategies such as conceptual diagrams, case analogies, and interdisciplinary integration, they not only enhance the depth of knowledge understanding and retention strength but, more importantly, continuously validate their learning abilities during strategy application, thereby directly reinforcing self-efficacy. Research shows that students who frequently use deep strategies score 29% higher on the “learning ability self-efficacy” subscale than those who use surface strategies (Zhou, 2022).

Achievement strategies indirectly enhance self-efficacy through goal attainment mechanisms. These strategies include metacognitive skills such as task decomposition, time management, and self-motivation, with the core focus on optimizing the learning process and maximizing

the probability of success. When students gradually complete tasks through precise goal setting, the achievement of each sub-goal serves as proof of ability, accumulating into strong evidence of efficacy. In a sample of college students in Guangxi, an increase of one standard deviation in the frequency of achievement strategy use resulted in a 0.37 standard deviation increase in academic self-efficacy (Lin, 2023).

Methodology

The participants in this study were 383 college students from various universities in Guangxi, China. The sample included a balanced representation of genders and majors, ensuring diversity in academic backgrounds. The participants were selected using a stratified random sampling technique to reflect the demographic characteristics of the college student population in Guangxi. This approach was intended to enhance the generalizability of the findings.

Three standardized instruments were used to collect data: the Academic Emotion Questionnaire, the Learning Strategy Scale, and the Academic Self-efficacy Questionnaire.

AEQ is a comprehensive tool for measuring students' academic emotions. It assesses a range of positive and negative emotions experienced in an academic setting, including enjoyment, hope, pride, anxiety, boredom, and frustration. Each item in AEQ is rated using a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The reliability and effectiveness of AEQ have been fully validated in previous studies (Pekrun et al., 2002).

LSS measures the frequency and variety of learning strategies used by students. It includes subscales for cognitive strategies (e.g., summarizing, expanding), metacognitive strategies (e.g., planning, monitoring, evaluating), and affective strategies (e.g., managing emotions, maintaining motivation). Participants rated each item on a scale from 1 (never) to 5 (always). This scale has demonstrated good psychometric properties in previous studies (Pintrich, 2000).

ASQ assesses students' beliefs about their own success in completing academic tasks and achieving educational goals. ASQ's programs cover all aspects of academic self-efficacy, including confidence in understanding course material, performing well on exams, and completing assignments. Responses were recorded on a Likert scale from 1 (not at all confident) to 5 (extremely confident). ASQ is a widely used tool with strong reliability and effectiveness (Schunk, 1991).

Data collection was carried out in several phases to ensure thoroughness and accuracy. Initially, permission was obtained from the relevant college authorities to conduct the study. Subsequently, participants were recruited through campus announcements and classroom visits. Informed consent was obtained from all participants, ensuring they were aware of the study's purpose and their rights as participants.

The questionnaires were administered in a classroom setting to ensure a controlled environment and to provide assistance if participants had any questions. Each participant was given a set time to complete the questionnaires, and measures were taken to ensure anonymity and confidentiality of responses.

The collected data were subjected to statistical analysis using SPSS 19.0. The analysis included several steps.
Descriptive statistics were calculated to summarize the demographic characteristics of the sample and the central and discrete trends of key variables. This includes the mean, standard deviation, and frequency distribution.

Pearson correlation coefficient was calculated to examine the relationship between academic emotion, learning strategy and academic self-efficacy. This analysis provides initial insights into the strength and direction of the associations between these variables.

Hierarchical regression analysis was conducted to investigate the predictive power of academic emotions and learning strategies on academic self-efficacy. This method allowed for the examination of the incremental contribution of each set of predictors while controlling for potential confounding variables. The regression models were built in steps.

Step 1: Demographic variables (e.g., gender, major) were entered to control for their effects.
Step 2: Academic emotions were added to examine their influence on academic self-efficacy.
Step 3: Learning strategies were included to assess their additional predictive power beyond academic emotions.

The hierarchical approach helped to identify the unique contributions of academic emotions and learning strategies to academic self-efficacy while controlling for other relevant factors.

The study adhered to ethical guidelines for research involving human participants. Ethical approval was obtained from the relevant institutional review board. Participants were informed about the study's aims, procedures, and their right to withdraw at any time without penalty. Confidentiality and anonymity were strictly maintained throughout the research process, and data were stored securely to prevent unauthorized access.

To ensure the reliability and validity of the instruments used in this study, several steps were taken.

A pilot test was conducted with a small sample of students to refine the questionnaires and ensure clarity and appropriateness of the items.

Internal consistency reliability of the scales was assessed using Cronbach's alpha coefficients. Values above 0.70 were considered acceptable.

Exploratory factor analysis (EFA) was conducted to verify the construct validity of the scales, ensuring that the items loaded appropriately on their respective factors.

Findings

First, descriptive statistics were calculated to outline the sample characteristics and the key variables measured in the study. The sample consisted of 383 college students from various universities in Guangxi, with balanced representation of gender and major. There were 192 men (50.1%) and 191 women (49.9%). Students' majors are roughly divided into science and engineering (195 students, 50.9%) and liberal arts (188 students, 49.1%).

The score of academic self-efficacy ranged from 2.50 to 4.80, with a mean score of 3.86 (standard deviation =0.67), indicating that the participants' academic self-efficacy was at a moderately high level. The score range of the positive emotion questionnaire was 3.00 to 4.90, with a mean score of 4.12 (standard deviation =0.58), indicating that students generally experienced positive academic emotions. The score range of the learning Strategies scale is 2.80 to 4.75, with an average score of 3.92 (standard deviation =0.61), indicating that students frequently use a variety of learning strategies.

An independent sample T-test was conducted to examine differences in academic self-efficacy based on gender and major. The results showed that there were significant differences in academic self-efficacy between boys and girls (t (381) =3.67, p<0.01), and boys (M=3.95, SD=0.65) showed higher self-efficacy than girls (M=3.77, SD=0.69).

In addition, there was a significant difference between science and engineering students and liberal arts students (t (381) =4.21, p<0.01). Science and engineering majors (M=4.00, SD=0.63) reported a higher sense of academic self-efficacy than liberal arts students (M=3.72, SD=0.70). These results suggest that gender and major play an important role in influencing students' academic self-efficacy.

To begin, descriptive statistics were calculated to provide an overview of the sample characteristics and the key variables measured in the study. The sample consisted of 383 college students from various colleges in Guangxi, with a balanced representation of genders and majors. Among the participants, 192 (50.1%) were male and 191 (49.9%) were female. The majors of the students were broadly categorized into science and engineering (195 students, 50.9%) and arts (188 students, 49.1%).

The academic self-efficacy scores ranged from 2.50 to 4.80, with a mean score of 3.86 (SD = 0.67), indicating a moderately high level of academic self-efficacy among the participants. The Academic Emotion Questionnaire scores for positive emotions ranged from 3.00 to 4.90, with a mean score of 4.12 (SD = 0.58), suggesting that students generally experienced positive academic emotions. The Learning Strategy Scale scores ranged from 2.80 to 4.75, with a mean score of 3.92 (SD = 0.61), indicating a frequent use of various learning strategies.

Pearson correlation coefficients were calculated to explore the relationships between academic emotions, learning strategies, and academic self-efficacy. The results are presented in Table 1.

Table 1
Correlation Matrix

Variable	1	2	3
1. Academic Self-Efficacy	1.000		
2. Positive Academic Emotions	0.537**	1.000	
3. Learning Strategies	0.482**	0.510**	1.000

Note: p < 0.01

The correlation analysis revealed a significant positive correlation between positive academic emotions and academic self-efficacy (r = 0.537, p < 0.01). This suggests that students who

experience more positive academic emotions tend to have higher levels of academic self-efficacy. Additionally, a significant positive correlation was found between the use of learning strategies and academic self-efficacy ($r = 0.482$, $p < 0.01$), indicating that students who employ a greater variety of learning strategies also report higher academic self-efficacy.

To further investigate the influence of academic emotions and learning strategies on academic self-efficacy, a hierarchical regression analysis was conducted. The analysis was performed in three steps.
Step 1: Gender and major were entered as control variables.
Step 2: Positive academic emotions were added to the model.
Step 3: Learning strategies were included.
The results of the hierarchical regression analysis are presented in Table 2.

Table 2
Hierarchical Regression Analysis Predicting Academic Self-Efficacy

Model	β	SE	t	R^2	ΔR^2
Step 1				0.089	0.089
Gender	0.198**	0.048	3.756		
Major	0.213**	0.046	4.124		
Step 2				0.372	0.283
Positive Emotions	0.489**	0.041	7.829		
Step 3				0.495	0.123
Learning Strategies	0.412**	0.043	6.541		

Note: $p < 0.01$

In Step 1, gender and major accounted for 8.9% of the variance in academic self-efficacy ($R^2 = 0.089$, $p < 0.01$).
In Step 2, the addition of positive academic emotions significantly increased the explained variance by 28.3% ($\Delta R^2 = 0.283$, $p < 0.01$), indicating that positive emotions are a strong predictor of academic self-efficacy.
In Step 3, the inclusion of learning strategies further increased the explained variance by 12.3% ($\Delta R^2 = 0.123$, $p < 0.01$), demonstrating that learning strategies also play a significant role in predicting academic self-efficacy.

5. Discussion

The present study aimed to investigate the influence of academic emotions and learning strategies on academic self-efficacy among college students in Guangxi, China. The results revealed several important insights:

The surveyed college students demonstrated moderately high levels of academic self-efficacy, with significant variations based on gender and major.
Male students reported higher academic self-efficacy than female students, and students majoring in science and engineering exhibited greater self-efficacy compared to those in the arts.

It is found that there is a significant positive correlation between positive academic emotion and academic self-efficacy.
The use of learning strategies, especially metacognitive and affective strategies, has a positive impact on academic self-efficacy.

These findings highlight the importance of cultivating positive academic emotions and effective learning strategies to enhance students' academic self-efficacy in the context of Chinese higher education.

The finding that male students exhibit higher levels of academic self-efficacy than female students align with existing literature. Research suggests that gender differences in self-efficacy can be attributed to various factors, including socialization processes, gender stereotypes, and differences in academic experiences and expectations (Bandura, 1997; Pajares, 2002). Male students often receive more encouragement to pursue and excel in STEM fields, which may enhance their self-efficacy beliefs.

Similarly, the higher self-efficacy observed among science and engineering students compared to arts students can be linked to the nature of these disciplines. STEM fields often emphasize problem-solving and analytical skills, which may foster a sense of competence and confidence in students. In contrast, arts disciplines might focus more on subjective interpretation and creativity, which may not as directly reinforce self-efficacy beliefs (Lent, Brown, & Larkin, 1986).

There is a significant positive correlation between positive academic emotion and academic self-efficacy, which is consistent with the control-value theory of achievement emotion. This theory suggests that emotions experienced in an academic setting are closely related to students' sense of control and worth over academic tasks (Pekrun, 2006). Positive emotions such as enjoyment, hope, and pride can enhance students' motivation and engagement, thereby increasing self-efficacy. When students experience positive emotions, they are more likely to attribute success to internal factors such as ability and effort, thus enhancing their self-efficacy beliefs (Pekrun et al., 2011).

The study found that the use of learning strategies has a positive impact on academic self-efficacy. This finding highlights the importance of strategic learning in developing students' confidence in their academic abilities. Metacognitive strategies such as planning, monitoring, and assessment enable students to effectively manage their learning process, thereby enhancing performance and enhancing self-efficacy (Zimmerman, 2000). Emotional strategies, which involve managing emotions and maintaining motivation, also play a key role in sustaining student effort and persistence in the face of challenges.
The results of this study have several practical implications for educators, administrators, and policymakers:

Educational institutions should create a supportive and encouraging learning environment that fosters positive academic emotions. This can be achieved through practices such as providing constructive feedback, celebrating student achievements, and promoting a growth mindset.

To address gender disparities in academic self-efficacy, schools and universities should implement gender-sensitive interventions that encourage female students to develop their self-efficacy, particularly in STEM fields. Mentorship programs, role models, and workshops that challenge gender stereotypes can be effective in this regard.

Educators should emphasize the importance of effective learning strategies in their teaching practices. Integrating training on metacognitive and affective strategies into the curriculum can help students become more self-regulated learners, thereby enhancing their academic self-efficacy.

Given the lower self-efficacy reported by arts students, targeted support programs that reinforce the value and applicability of arts education can help boost their confidence. Providing opportunities for arts students to showcase their work and receive positive reinforcement can also contribute to higher self-efficacy.

Although this study provides valuable insights, there are some limitations. Cross-sectional design limits the ability to draw causal inferences. Longitudinal studies are needed to examine the effects of academic mood and learning strategies on self-efficacy over time. In addition, reliance on self-reported measures may introduce response bias. Future studies could combine objective measures of academic performance with more diverse samples to enhance the generality of the findings.

In addition, while this study focuses on positive academic emotions, exploring the impact of negative emotions such as anxiety and frustration on self-efficacy will contribute to a more complete understanding of emotional dynamics in academic Settings. Studying the interactions between different types of learning strategies and their combined effects on self-efficacy may also provide richer insights.

Conclusion

This study focuses on the interactive mechanisms among academic emotions, learning strategies, and academic self-efficacy among college students in Guangxi. Through empirical analysis, the following core conclusions were revealed.

Male students and science and engineering students exhibit significantly higher academic self-efficacy than female students and liberal arts students. This difference must be interpreted within a sociocultural context: science and engineering tasks provide immediate feedback, which facilitates the accumulation of evidence validating one's abilities, while humanities tasks often involve ambiguous evaluations that can lead to self-doubt. Additionally, social expectation effects reinforce gender role perceptions—male role models are more prevalent in science and engineering fields, indirectly enhancing males' efficacy beliefs; females, meanwhile, are more susceptible to subjective evaluations in humanities learning, leading to fluctuations in their self-efficacy.

Positive academic emotions (such as enjoyment of learning and interest in exploration) form a synergistic reinforcement mechanism with self-efficacy. Positive emotions promote deep learning strategies (such as cross-disciplinary knowledge integration) by expanding cognitive resources (such as enhancing working memory breadth), thereby improving learning efficiency and validating abilities. High self-efficacy reduces anxiety by enhancing task control expectations, maintaining a positive emotional state, and forming a virtuous cycle of ‘confidence → engagement → success → stronger confidence.’

Among learning strategies, deep strategies and metacognitive strategies are most critical for enhancing self-efficacy. Metacognitive strategies transform ordinary learning into opportunities for efficacy validation—for example, the process of students actively adjusting their plans after experimental failure reinforces belief in ability more than success itself. Strategy preferences exhibit group specificity: males tend toward achievement-oriented strategies, while females prefer relationship-building strategies, necessitating tailored training pathways.

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