

The Impact of High School Students' Social-emotional Competence on Academic Achievement: Research Progress on the Mediating Role of Learning Adaptability and Learning Motivation

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Abstract. The regulation function of learning motivation and adaptability is the main subject of this work, and explores the relationship between high school students' social-emotional competence and academic performance. The study examines the relationship between social-emotional competence, academic achievement, learning adaptability and learning motivation, and constructs the theoretical path of "social-emotional competence → learning adaptability → learning motivation → academic achievement", which draws on previous researches results at home and abroad. These results show an important non-cognitive factor of academic success is social-emotional competence. Stronger regulation of emotions, interpersonal communication, self-management, and responsible decision-making skills will increase students' chances of adjusting to the classroom, sustaining steady learning motivation, and achieving high-quality educational outcomes. The regulation function of learning motivation and adaptability is the main topic of this project. In addition to being an independent regulating factor, learning adaptability and learning motivation may also combine with each other to form a continuous chain regulation mechanism. The study also emphasizes the importance of learning adaptive counseling, motivational support, and school-level social-emotional learning strategies. Future studies should develop standardized assessment instruments and conduct intervention research to confirm the chain adjustment model's practical efficacy.

Keywords: Education, social-emotional competence, learning adaptability, learning motivation, academic achievement

1. Introduction

With the continuous deepening of educational research, the impact of non-cognitive factors (such as motivation, interest, emotion, will and personality) on students' academic development has become a core issue that has attracted much attention from the academic community. High school students are at an important stage of transition from adolescence to adulthood, during which their physiological,

psychological and social roles have undergone profound changes, making them more susceptible to non-cognitive factors. Social-emotional competence is a key variable in predicting academic achievement, career development and life satisfaction [1]. Academic achievement is a key indicator to measure students' learning level [2]. At present, a good deal of domestic studies on the variables influencing high school pupils' academic performance use a single intermediary variable as their research design.; only a few studies explore the dual intermediary effect of learning adaptability and learning motivation concurrently. This essay primarily examines the fundamental relationship between social-emotional competence and high school students' achievement in school. thoroughly examine the main findings and constraints of pertinent empirical research conducted both domestically and internationally, further clarify the interaction path and boundary conditions between various variables, and build "social-emotional competence - learning adaptability" - The theoretical framework of "Learning Motivation - Academic Performance". Understanding the mechanism of non-cognitive factors on academic development can support theoretical research. The conclusion of this study can provide an empirical basis for schools to carry out social emotional education, optimize learning adaptive guidance and stimulate learning motivation. In this way, it will also help to improve the relevance and effectiveness of educational interventions.

2. Core concepts

2.1. Social-emotional competence and academic achievement

Social-emotional Competence (SEC) refers to a person's capacity to recognize and manage their emotions as well as keep an eye on and organize the way they think, build a stable and harmonious interpersonal society and form a sense of responsibility and decisiveness. It is a variety of psychological and behavioral characteristics shown by individuals in social interaction [3]. Social-emotional competence is of great value to students' growth, the advancement of educational practice, and their long-term development. It can support psychological stability, foster self-satisfaction and internal motivation, and favorably predict children's academic success and social development status. In the long run, this is more conducive to shaping a sound personality, promoting the comprehensive improvement of students' comprehensive quality, and laying a solid foundation for the cultivation of their school performance and future social adaptability [4]. The effectiveness of students' learning in school can be intuitively reflected through academic performance. This factor not only affects the development prospects of everyone's future study and employment, but also significantly affects the mobility of the entire social class and economic status. This is an important manifestation of educational equity at the individual level [5]. Academic performance is defined as students' cognitive achievement in a particular discipline, generally measured by exam results, and is regarded by many research in the field of education as a core assessment indicator. However, a variety of factors, including individual variations, family history, and learning environment, frequently have a direct effect on academic achievement. Studying the factors affecting learning outcomes helps students regulate their emotional and cognitive states, so that they can learn efficiently and achieve their learning goals. This also helps to optimize the allocation of educational resources, so that teachers can understand students and raise educational standards [6]. The study analyzes the intrinsic logic and influence law of social-emotional competence on the academic growth of high school students, taking the academic performance of high school students as the dependent variable. Therefore, the study attempts to clarify the path and underlying mechanism of the impact of social-emotional competence on academic performance among high school students,

which can provide effective reference and practical ideas for the subsequent targeted cultivation of students' social emotional ability and the implementation of relevant teaching activities.

2.2. Learning adaptability

The ability of students to overcome learning obstacles and accomplish educational goals is referred to as learning adaptation that ensues. It has a significant impact on the actual learning effect and is connected to students' overall quality improvement as well as their development both mentally and physically [7]. According to the study, one of the direct elements influencing students' learning results is learning adaptability. A person's degree of learning adaptability will be indirectly impacted by a wide range of things, such as family environment, school environment and social support [8]. According to research, emotional adaptation is the process of learners adapting to environmental changes and academic demands, and independently adjusting learning strategies and behavior patterns when integrating into the learning environment. This level of learning adaptability can make students perform differently in new environments, thus producing different learning outcomes [9].

2.3. Learning motivation

Learning motivation is a complex and multidimensional concept, covering a variety of psychological and behavioral factors. Specifically, it refers to an intrinsic psychological process or internal driving force guided by goals or purposes that can stimulate and maintain individual learning activities. Research shows that the impact of learning motivation on academic performance is unstable and domain-specific [10]. Learning motivation is easily influenced by individual psychological characteristics, emotional state and environmental factors.

Based on this, the study puts forward the hypothesis that learning motivation is a key intermediary variable connecting high school students' social-emotional competence and academic performance, which plays an important role in the relationship between the two.

3. Discussion

3.1. The correlation and predictive role of high school students' academic achievements and social-emotional competence

The social-emotional competence of high school students can be stable and positive in prediction of academic performance, and the prediction effect is particularly prominent. This association is not only reflected in the direct influence but also exerts an indirect effect through pathways such as learning motivation, self-efficacy, and interpersonal support, which has been confirmed in multiple empirical studies.

Relevant previous studies show that high school students with excellent social-emotional competence (self-awareness, self-management, social consciousness, interpersonal relationships, responsible decision-making, and growth mindset) perform better in emotional regulation, academic concentration, goal persistence, and cooperative learning, and thus achieve higher academic results, stronger academic abilities, and more positive academic emotions. In the comparative analysis of 2022, Wu Enci concluded that social emotional ability can effectively predict the academic development of adolescents. Among them, responsible decision-making, self-management, and growth mindset have particularly prominent predictive power for academic performance and academic emotions [11]. According to the study, social-emotional competence in the self-efficacy

path indirectly improves academic achievement by boosting students' confidence in their own capacity for learning, and this path shows a complete mediating effect. Through the teacher-student relationship pathway, social-emotional competence provides support for students' academic development by enhancing student-teacher communication and establishing a nurturing learning environment [12].

In terms of the operation mechanism, on the one hand, it effectively guides academic anxiety and strengthens learning participation. On the other hand, it relies on the integration of home-school support resources to indirectly empower academic growth. In the study of rural students in the western region, social-emotional competence plays an intermediary role in the path of family capital affecting academic performance, and is a key protective factor to support disadvantaged students to achieve better academic performance [13]. Greenberg found that social emotional learning intervention can improve students' academic performance by about 11% to 17% on average. In addition, this improvement has long-term stability and is still significant in high school [14]. For high school students, social-emotional competence can not only predict current academic performance, but also regulate emotional disorders, so as to achieve a higher learning state. It becomes a core non-cognitive predictive indicator, distinguishing it from intellectual factors [15].

Combined with the existing empirical conclusions, in addition to predicting students' daily academic performance, this literacy can also solve emotional problems and help students maintain an efficient learning state. It is an important basis for academic research and judgment to distinguish it from intellectual factors [15]. This influence runs through many levels, including cognition, motivation and situational support, showing irreplaceable value in improving academic performance and promoting comprehensive development. However, the existing research has not reached a consensus on its specific impact path on academic achievement. In this process, the intermediary role of learning adaptability and learning motivation still needs to be further systematically explored.

3.2. The separate intermediary role of learning adaptability and learning motivation

3.2.1. The distinct mediating function of learning adaptability

As a key intermediate variable connecting social ability, emotional ability and academic performance, learning adaptability can independently act as an intermediary variable and affect the path of high school students' academic performance. It is an important mechanism to ensure the stability of academic status and promote the improvement of academic performance. As the core non-cognitive ability of teenagers to adjust their learning status, relieve their academic emotions, and resolve the learning burden, learning adaptability is strongly positively impacted by social-emotional competence, which ensures that pupils will keep a high level of learning and achieve good academic adaptability. A longitudinal tracking study was conducted in the spring semester of 2024 (T1) and the spring semester of 2025 (T2). The research indicates that adolescents with high levels of social-emotional competence can maintain a more stable psychological state when facing changes in the learning environment and challenges of academic tasks, and their learning adaptability performance is better. Moreover, this positive effect demonstrates temporal continuity [16].

Academic performance will also be significantly affected by learning adaptability. A study on freshmen shows that mental health status enhances academic self-efficacy and ultimately improves academic achievement by improving the level of learning adaptability. Learning adaptability is one of the most important independent mediating factors among them in the path by which mental health affects academic development and can independently explain the predictive effect of some

psychological factors on academic performance. Although this study targeted college students, it reveals mediating mechanism also offers important implications for understanding high school students. This result indicates that learning adaptability is not an auxiliary mechanism dependent on other variables, but can independently convey the role of psychological state on academic performance, becoming an important entry point for improving academic predicaments [17].

Overall, the independent mediating role of learning adaptability is reflected in its ability to independently absorb the positive influence of an individual's internal psychological resources, reducing the interference of academic risk factors, and providing stable psychological support for academic engagement, academic resilience, and academic achievement. Long-term development tracking during the high school stage has verified that learning adaptability can independently mediate social-emotional competence and academic achievements, and it is a core variable worthy of focused attention in educational intervention.

3.2.2. The independent mediating role of learning motivation

Social-emotional competence, as the core non-cognitive abilities for individual emotion regulation, interpersonal interaction, self-management and responsible decision-making, which has a major beneficial effect on the growth of learning motivation, and has become an important support for mobilizing and maintaining the subjectivity of learning.

Many research results show that students with a high level of social-emotional competence have a stable and orderly learning state, clear and orderly learning planning, and more active learning [18]. Good social-emotional competence can reduce academic burnout, relieve learning anxiety, and enable students to maintain a positive attitude in the face of learning pressure, so as to maintain a stable level of learning motivation [16]. The influence of social-emotional competence on academic performance has many sources and ways. The stimulation of students' learning motivation is not only directly affected by their own social-emotional competence, but also by the classroom ecosystem: teachers' social-emotional competence is an important external environmental factor. They can provide external help to activate students' learning motivation by establishing supportive teacher-student relationships and creating a positive classroom atmosphere, thus indirectly affecting academic performance. The teachers with high social-emotional competences are better at empathetic understanding, emotion management and positive interaction, which can effectively reduce students' emotional filtering and enhance their learning autonomy and intrinsic motivation [19].

Learning motivation, as the core internal driving force for students to carry out learning activities, has a significant positive predictive effect and a stable promoting effect on academic achievement, and which is a key non-cognitive factor determining academic achievement [18]. Previous studies have confirmed that students with strong intrinsic motivation tend to show higher interest in learning and more lasting learning behavior, which can encourage an increase in academic achievement. Excellent academic achievement can also boost students' self-esteem and willingness to learn, creating a positive feedback loop that will further boost academic achievement [20].

Social-emotional competence not only directly and positively predict learning motivation, but also play a role through the dual paths of psychological resource optimization and classroom environment support. Overall, the optimization of psychological resources and the support of the classroom environment are indispensable core elements to stimulate and maintain learning motivation. Besides to being a crucial requirement for academic success, learning motivation is also a critical safeguard in the process of academic growth. This ability can effectively improve academic performance and has unique value in promoting students' continuous learning and

development. These studies have confirmed that learning adaptability can regulate the relationship between social-emotional competence and academic performance, making it an important core variable at this stage.

3.3. The chain mediation effect of learning motivation and adaptability

3.3.1. The mediating effect of learning motivation between adaptability social-emotional competence and academic achievement

This study used appropriate scales to survey 787 students in junior high schools in the context of China's "Double Reduction" policy aiming to confirm the presence of a chain mediation relationship among multiple variables [21]. This study employed the Learning Adaptability Scale, the Academic Motivation Scale, the Self-Management Scale, and the Self-Regulated Learning Strategy Questionnaire, and analyzed the data by using structural equation modeling and the Bootstrap method (1000 samples). The results indicated that learning adaptability had a significant positive effect on the prediction of academic motivation ($\beta = 0.29$, $p < 0.001$), academic motivation had a significant positive predictive effect on self-management ($\beta = 0.62$, $p < 0.001$), and self-management further predicted self-regulation learning ability ($\beta = 0.64$, $p < 0.001$). Furthermore, academic motivation and self-control acted as agents in the chain of mediation effect between learning adaptability and independent learning. With a 95% confidence interval of [0.08, 0.16], the effect value was 0.11. This essentially highlights how learning adaptability contributed to students' desire to learn, which in turn increased their academic achievement.

Students' ability to respond to changes in the educational environment is known as learning adaptability, and it has been indicated to be an important mediator between academic achievement and social-emotional competence. Some researchers conducted a large-scale survey of 3871 first-year college students in China. They used a few different tools: the SCL-90 to measure mental health, the CCSAS for learning adaptability, the ASSES for self-efficacy, and they used students' competitive quality assessment scores as a measure of academic achievement [22]. Data were analyzed using structural equation modeling (SEM) and the Bootstrap method (5,000 resamples). Here's what they found: mental health and learning adaptability had a significant negative relationship ($r = -0.291$, $p < 0.01$), learning adaptability has a strong positive correlation with academic self-efficacy ($\beta = 0.80$, $p < 0.001$), and academic self-efficacy further predicted academic achievement ($\beta = 0.10$, $p < 0.01$). More importantly, learning adaptability and academic study efficiency played a chain mediation role within academic achievement and psychological health. The chain mediation effect proved to exist with a 95% confidence interval of [-0.029, -0.003] and a chain mediation effect value of -0.016, which accounts for 40.57% of the total effect [22].

3.3.2. The mediating role of learning motivation between adaptability social-emotional competence and academic achievement

Learning motivation refers the driving force inside students' for engagement in learning, plays a important mediating role between social-emotional competence and academic achievements. A study was carried out on 404 college students in Shanghai who participated in online English courses [18]. The tool of measuring emotional intelligence is Wong-Law Emotional Intelligence Scale, the ARCS Motivation Scale to measure learning motivation, and the General Self-Efficacy Scale to measure self-efficacy. The scores in English final exam were taken as the indicator of academic achievements. The study used structural equation modeling (SEM) and Bootstrap methods

for data analysis. There's what the results showed: emotional intelligence had a strong positive effect on learning motivation ($\beta = 0.664$, $p < 0.05$). Then learning motivation had a strong positive effect on self-efficacy ($\beta = 0.553$, $p < 0.05$), and self-efficacy in turn predicted academic achievement ($\beta = 0.278$, $p < 0.05$). Therefore, emotional intelligence didn't have a direct effect on academic achievement ($\beta = -0.006$, $p > 0.05$). Instead, it worked indirectly through the chain mediation of learning motivation and self-efficacy. That total indirect effect was 0.193, with a 95% confidence interval of [0.093, 0.303]. This result means that the impact of emotional intelligence on academic achievements is fully realized through the chain transmission path of "learning motivation $\rightarrow$ self-efficacy". Focusing solely on the straight promoting effect of emotional intelligence on academic achievements would completely underestimate its actual influence mechanism - emotional intelligence first helps students identify and control their own emotions, thereby improving their learning motivation; driven by learning motivation, students are more likely to accumulate learning experiences, and further encourage their self-efficacy in completing English learning tasks and reflected in higher final exam scores. Therefore, in teaching contexts, cultivating students' emotional intelligence should be seen as a necessary task, while stimulating learning motivation and fostering self-efficacy are the "necessary channels" and key intervention links to transform emotional intelligence into academic achievements.

3.3.3. The chain mediating role of learning adaptability and learning motivation

Overall, between social-emotional competence and academic achievement, there might be a chain mediation path made up of learning adaptability and learning motivation: social-emotional competence $\rightarrow$ learning adaptability $\rightarrow$ learning motivation $\rightarrow$ academic achievement. Students who are stronger in social-emotional competence are better at recognizing and controlling their emotions. And because of this, they can adapt more quickly to new learning environments and academic demands — and that's the present of higher learning adaptability. A good learning adaptability enables students to effectively deal with the challenges brought by learning, thereby improving their motivation for learning will encourage students to invest more energy and effort, ultimately leading to greater academic achievements.

4. Summary of the overall conclusion of the current research

4.1. An overview of the current analysis's overall conclusion

Firstly, social-emotional competence and academic achievement are significantly positively correlated. Multiple studies have consistently found that students who are better at social-emotional competence usually have higher academic achievement. And this holds true across different groups — like high school and college students [22, 23].

Secondly, learning adaptability and learning motivation respectively play mediating roles between social-emotional competence and academic achievement. This research has demonstrated that learning adaptability is one of the factors in the chain mediating path, and through the improvement of learning adaptability, social-emotional competence can indirectly promote academic achievement [22]. At the same time, research has shown that learning motivation is also a mediating variable influencing social-emotional competence and academic achievement, and learning motivation has a significant incremental predictive validity for academic achievement [18, 22].

Learning adaptability and learning motivation may form a chain mediating path. By integrating the "learning adaptability $\rightarrow$ self-efficacy" path, the "learning motivation $\rightarrow$ self-efficacy" path, and

the "learning adaptability → academic motivation → self-management" path, it can be found that learning adaptability and learning motivation function in the order of adaptability first and motivation subsequently [21, 22]. This finding provides a theoretical foundation for the complete chain mediating model of "social-emotional competence → learning adaptability → learning motivation → academic achievement".

4.2. Education implications and recommendations based on the findings

Based on the above findings, this article will give some practical suggestions to help shape educational models and methods in the future — especially when it comes to dealing with student-related issues.

Emphasize the cultivation of social and emotional skills within high school students. Research indicates that social-emotional competence not only affect students' interpersonal adaptation and mental health but are also significant predictors of academic achievement. Schools should incorporate social and emotional learning (SEL) into their regular cultivation program of students through added courses, psychological assessments, class activities about improving social-emotional competence, and other means to systematically develop students' core abilities such as emotion management, communication ability, and responsible decision-making.

Learning adaptability is one of the mediating factors influencing academic achievement. The chain mediation model shows that learning adaptability is the first mediating factor of social-emotional competence affect academic achievement.

Educators should give more attention to students' learning adaptability during their transitional periods. For example, the transition junior high school between senior high school. They can encourage students quickly adapt to new learning environments and requirements of study through orientation programs for new students, guidance on learning plans, and time management training, thereby setting the foundation for improvement of learning motivation and academic success later.

Learning motivation is also a factor influencing academic achievement. It is another mediating factor in the chain mediation path and directly affects academic achievement. Teachers should enhance students' learning motivation by setting appropriately challenging tasks, providing positive feedback on their learning, and cultivating a relaxed and supportive classroom atmosphere. For students with weaker social-emotional competence or poorer learning adaptability, teachers should use individualized motivational measures to help them be more confident and comfortable in learning .

4.3. Future research directions

First of all, researchers should develop standardized measurement tools and verify their applicability. Different studies use different measurement tools for social and emotional abilities (such as the Big Five personality framework, emotional intelligence scales, SCL-90, etc.). Future research could attempt to adopt standardized social and emotional ability assessment tools recommended by international organizations such as the OECD and verify their applicability among Chinese high school students.

Secondly, future research should explore the influence mechanism models of more factors and the changes in the chain mediation model. Future research could introduce additional variables. For instance, gender, grade level, socioeconomic status, and school climate—to examine whether the chain mediation pathways vary across different groups or environments.

Furthermore, intervention studies based on the chain mediation model should be conducted. Future research could design targeted intervention programs (such as enhancing learning adaptability first and then strengthening learning motivation), verify their effectiveness in practical intervention through the chain mediation model, and provide guidance for education.

5. Conclusion

This study explores how high school students' social-emotional skills influence their academic performance, systematically reviewing how learning adaptation and learning motivation plays the dual mediators in this process. Existing research has confirmed that social-emotional competence are a comprehensive characteristic of an individual's emotion regulation, personal communication skills, and self-management skills, which help predict high school students' academic success in a positive way. This effect is not only reflected in the direct influence on students' academic performance but also can be exerted indirectly through paths such as self-efficiency and the relationship between the teachers and students, making it a key influencing factor for students' performance in school and long-term development. At the same time, academic achievement, as a main indicator for measuring students' learning outcomes, not only concerns individual further education and career development but also serves as an important observation dimension for educational equity and social mobility.

Further analysis reveals that learning adaptability and learning motivation serve as crucial mediating bridges connecting social-emotional competence with academic achievement. On one hand, social-emotional competence enables students to face the academic pressures and transitions of high school and promote better learning ability. On the other hand, it strengthens their motivation to learn and stimulating their learning engagement and perseverance in pursuing the goal. These two factors work together, forming a chain mediation pathway that ultimately causes academic success. What's more, teachers can also influence students' academic achievements from the outside through their own social-emotional competence in the classroom. For example, when teachers build a relaxed and nurturing classroom atmosphere and build positive relationships with students, that helps activate students' learning motivation — and that, in turn, leads to better academic achievements.

In conclusion, social-emotional competence is a major non-cognitive factor that affects high school students' academic achievement, and it works at multiple levels — both in terms of students' own personal resources and their external learning environment. Future research could dig deeper into how these mediating effects might differ depending on the situation. In educational practice, appropriate interventions should be made to students' social- emotional competence, with an emphasis on their systematic cultivation. By optimizing learning adaptation strategies and learning motivation stimulation paths, these supports can be help boost high school students' academic growth.

Author contribution

All the authors contributed equally and their names were listed in alphabetical order.

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