Influence of Metacognitive Ability of College Students on Learning Motivation: A Study on the Regulating Effect of Learning Strategies

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Abstract: This study focuses on the intrinsic connection among metacognitive ability, learning motivation and learning strategies of college students, aims to explore the influencing mechanism of metacognitive ability on learning motivation and the regulating effect of learning strategies in this process. By sorting and analyzing relevant theories and combining with the learning characteristics of college students, it makes clear that metacognitive ability acts on learning motivation through cognitive monitoring, planning and reflection, and other dimensions, and the reasonable application of learning strategies can strengthen or weaken the effect of metacognitive ability on learning motivation. Research has found that higher metacognitive ability helps stimulate students' intrinsic learning motivation, and the mastery and application of adaptable study strategies can further promote the transformation of metacognitive ability into positive learning motivation. Based on this, this study provides theoretical basis and practical ideas for enhancing students' learning motivation and optimizing learning guidance in the teaching of higher education.

Keywords: College Students; Metacognitive Ability; Learning Motivation; Learning Strategies; Regulating Effect

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1.Introduction

At the stage of higher education, students' learning is no longer confined to passive reception of knowledge, and emphasizes more on active exploration, autonomous construction and deep thinking instead. As the core driving force for students to carry out learning activities, learning motivation directly affects their learning engagement, academic performance and personal development potential [1]. As an individual's ability to monitor, regulate and reflect on their own cognitive process, metacognitive ability plays a key role in students' autonomous learning process, and its development level is often closely related to the learning effect. Meanwhile, as a series of methods and means adopted by students to achieve their learning goals, learning strategies serve as an important bridge connecting metacognitive ability with learning practice. In recent years, educational field has shifted its emphases from "what to learn" to "how to learn", and metacognitive ability, learning motivation and learning strategies have become research hotspots [2]. Previous studies have respectively explored the three. However, further in-depth analysis is still needed on how metacognitive ability specifically affects learning motivation and whether there is a regulating effect of learning strategies in this process. Colleges and universities are important places for cultivating high-quality talents. Therefore, it is of great practical significance to make clear the relationship among the three for improving teaching quality and promoting the all-round development of students.

2.Definition of Core Concepts

2.1 *Metacognitive Ability of College Students*

Metacognition was first proposed by psychologist Flavell. He believed that metacognition is an individual's knowledge and monitoring of their own cognitive processes and outcomes. Based on the learning-situated context of college students, this study defines the metacognitive ability of college students as the ability of college students to actively monitor, plan, regulate and reflect on their perception, memory, thinking and problem solving, and other cognitive processes during learning activities. It mainly consists of three core dimensions: the first is metacognitive knowledge, that is, students' understanding of their own cognitive ability, the characteristics of learning tasks, and the applicable conditions of learning methods; The second is metacognitive monitoring, which refers to students' real-time tracking of the progress of cognitive activities during the learning process and assessment on whether the

learning outcomes meet the expected goals. The third is metacognitive regulation, which means to regulate the learning plans, methods or strategies in a timely manner based on the monitoring results to ensure the realization of learning goals [3]. The metacognitive ability of college students has the characteristics of initiative, systematicity and development. With the accumulation of learning experience and the maturity of thinking ability, their metacognitive ability will be gradually improved.

2.2 *Learning Motivation of College Students*

Learning motivation is an intrinsic psychological process that stimulates, maintains students' learning activities and prompts them to move towards certain learning goals. According to the source of motivation, the learning motivation of college students can be divided into intrinsic learning motivation and extrinsic learning motivation. Intrinsic learning motivation stems from students' interest, curiosity or thirst for knowledge in learning itself. Through learning, students can gain intrinsic satisfaction and a sense of achievement. Extrinsic learning motivation is driven by external factors, such as scholarships, graduation or others' expectations. The learning motivation of college students is complex and dynamic. The types and intensity of their motivation are influenced by various factors such as personal values, learning environment, and teaching methods. Strong and stable learning motivation can prompt students to actively spend more time and energy in their studies, while insufficient motivation can easily lead to problems such as learning burnout and perfunctory learning.

2.3 *Learning Strategies of College Students*

Learning strategies are the sum total of a series of plans, methods and techniques that students consciously use to enhance learning efficiency and achieve learning goals. According to their functions, learning strategies of college students can be classified into cognitive strategies, metacognitive strategies and resource management strategies. Cognitive strategies directly act on learning materials, including retelling, fashioning, organization, and other methods; Metacognitive strategies focus on the monitoring and regulation of the learning process, such as formulating learning plans, self-examination, reflection and summary, etc. Resource management strategies involve the efficient use of external resources such as learning time, environment, and support from others [4]. The learning strategies of college students are characterized by pertinence and flexibility. Outstanding students can choose and use appropriate learning strategies based on different learning tasks and their own situations. Students who use strategies improperly or lack strategic awareness often find it difficult to complete their learning tasks efficiently.

3.The Influencing Mechanism of Metacognitive Ability of College Students on Learning Motivation

3.1 *Metacognitive Knowledge Provides Cognitive Basis for the Formation of Learning Motivation*

Metacognitive knowledge enables students to clearly know their cognitive strengths and weaknesses, understand the difficulty and ability requirements of different learning tasks, and then make reasonable judgments on the feasibility of learning goals. When students are clear that they have the ability to complete a certain learning task and realize that the task itself is both challenging and valuable, they are more likely to have the willingness to try, thereby stimulating their internal learning motivation. For instance, students who have mastered metacognitive knowledge know that they have strong logical reasoning ability. When facing complex professional theoretical learning tasks, they will regard them as opportunities to leverage their strengths rather than insurmountable obstacles. This kind of cognition will prompt them to actively engage in learning. Meanwhile, metacognitive knowledge can also help students find suitable learning methods for themselves. When students achieve good learning outcomes through specific methods, they will enhance their confidence in learning and further strengthen their learning motivation. Conversely, if students lack metacognitive knowledge and have a hazy understanding of their own ability and learning tasks, they may either develop a fear of difficulty due to overly high goals, thereby weakening their motivation to learn, or feel bored because the goal is too low, thereby making it difficult to stimulate their intrinsic interest.

3.2 *Metacognitive Monitoring Regulates and Reinforces Learning Motivation Through Feedback*

Metacognitive monitoring is the real-time tracking and assessment of students' own cognitive activities during the learning process. This process can provide students with timely feedback information, and feedback is an important factor to reinforce learning motivation. When students discover that their learning behaviors are consistent with their learning goals and they have made phased progress through metacognitive monitoring, they will gain a sense of achievement and satisfaction. This positive emotional experience will further stimulate their intrinsic learning motivation and prompt them to be more proactive in subsequent learning. For instance, during the process of writing a thesis, students find that they are gradually approaching their expected goals by regularly checking their writing progress and assessing the quality of content, and will be more determined to complete the thesis. Conversely, if students lack metacognitive monitoring and cannot keep abreast of their learning progress in a timely manner, they may not be able to perceive their problems such as lagging learning or improper learning methods in time, which will easily lead to learning frustration and further weaken their learning motivation [5]. In addition, metacognitive monitoring can also help students accurately find the causes of learning outcomes. When making progress in their study, they can attribute it to their own ability and efforts, which can enhance their self-efficacy and strengthen learning motivation. When learning fails, they can objectively analyze the causes and avoid attributing them to uncontrollable factors, which can help them maintain learning motivation.

3.3 *Metacognitive Regulation Maintains Learning Motivation Through Goal Optimization*

Metacognitive regulation is the process by which students regulate their learning plans, methods, etc. based on the results of metacognitive monitoring. Its core lies in ensuring the effectiveness of learning activities by optimizing learning goals and pathways, thereby maintaining the stability of learning motivation. During the learning process, the initial learning goals of students may seem unreasonable due to changes in objective conditions or their own cognitive biases, at which point, metacognitive regulatory ability comes into play. If the goal is too high, students can break it down into a series of achievable phased goals through regulation, reduce the difficulty of tasks, and avoid feeling frustrated due to the inability to achieve the goal. If the goal is too low, they can appropriately raise the goal requirements and increase the challenge of tasks to avoid being weary of learning due to overly simple learning content. For instance, during the exam preparation process, if students find that the original plan for the review is too tight and difficult for them to complete, they can regulate the daily review content and progress through metacognitive regulation, break down the big goal into some small goals such as "mastering one chapter's knowledge points every day" and gradually advance them. Meanwhile, metacognitive regulation can also help students regulate their learning methods in a timely manner according to changes in learning tasks. When a certain method is not effective, they should actively try new methods to improve learning efficiency and avoid weakening learning motivation due to low learning efficiency caused by improper methods.

4.The Regulating Effect of Learning Strategies on the Influence of Metacognitive Ability on Learning Motivation

As a bridge connecting metacognitive ability and learning practice, learning strategies do not simply convey the influence of metacognitive ability. Instead, through their own selection and application, they have a regulatory effect on the relationship between metacognitive ability and learning motivation. This regulatory effect is mainly manifested in the fact that different types of learning strategies and the application level of learning strategies will cause differences in the intensity and direction of the influence of metacognitive ability on learning motivation.

4.1 *The Regulating Effect of Cognitive Strategies*

Cognitive strategies directly act on the processing of learning materials, and their application level will affect the stimulating effect of metacognitive ability on learning motivation. When students have a high level of metacognitive ability and master and are able to flexibly use effective cognitive strategies (such as fine-processing and organizational strategies), the positive influence of metacognitive ability will be strengthened on learning

motivation. Metacognitive ability enables students to realize the applicable conditions of cognitive strategies, and the effective application of cognitive strategies can help students complete learning tasks efficiently and achieve learning outcomes quickly. This efficient learning experience will enhance students' sense of self-efficacy, make the learning goals guided by metacognitive ability easier to achieve, and thereby stimulate stronger intrinsic learning motivation. For instance, students with high metacognitive ability know that when learning professional knowledge, using the "mind mapping" organizational strategy can make the knowledge framework clear. And when they successfully master complex knowledge systems through this strategy, they will approve their own metacognitive judgments more and develop a stronger interest in learning. On the contrary, if students have high metacognitive ability, but lack effective cognitive strategies, or use cognitive strategies improperly, their metacognitive ability will be difficult to translate into actual learning outcomes. Even if students can monitor their problems in the learning process, they cannot solve them through reasonable cognitive processing methods, which will eventually lead to a sense of frustration and weaken the positive influence of metacognitive ability on learning motivation.

4.2 *The Regulating Effect of Metacognitive Strategies*

There is a certain overlap in the connotation of metacognitive strategies and metacognitive ability. However, metacognitive strategies focus more on specific operation methods, and their application will further amplify the influence of metacognitive ability on learning motivation. If students with strong metacognitive ability can expertly use metacognitive strategies (such as formulating detailed study plans, conducting regular self-reflection, and timely self-test, etc.), will enable the monitoring and regulatory functions of metacognition to be more fully exerted. By formulating study plans, students can define their learning directions and reduce the blindness of their studies. Through self-reflection, they can constantly optimize their learning methods. Self-test can verify the learning effect in a timely manner. The application of these strategies makes students' learning activities more organized and effective, and ensures the achievement of learning goals, thereby continuously strengthening their learning motivation. For instance, students with strong metacognitive ability can make a weekly study schedule, rethink and summarize it on weekends, and adjust their schedule for the next week in a timely manner. This systematic application of metacognitive strategies enables students to clearly see their progress and thus maintain their stable learning motivation. On the contrary, if students have strong metacognitive ability, but lack systematic metacognitive strategies, their metacognitive monitoring and regulation often remain at a hazy level and cannot be implemented in specific learning actions, resulting in a chaotic learning process, and making it difficult to embody the promoting effect of metacognitive ability on learning motivation.

4.3 *The Regulating Effect of Resource Management Strategies*

Resource management strategies involve the use of external resources such as learning time, environment and interpersonal relationships. Their rational application can provide favorable external conditions for the transformation of metacognitive ability into learning motivation, thereby regulating the influence of metacognitive ability on learning motivation. If students with high metacognitive ability can effectively use resource management strategies, such as rationally planning study time, creating good learning environment, and actively asking for help from teachers and classmates, they can reduce external distractions during the learning process and improve learning efficiency. When metacognitive ability guides students to set learning goals, resource management strategies can provide support for the realization of these goals, enable students to overcome difficulties more smoothly during the learning process, reduce learning frustration caused by insufficient external resources, and thereby protect and strengthen learning motivation. For instance, students with strong metacognitive ability realize that a certain course is difficult to learn and requires more study time and guidance. Through resource management strategies, they will rationally allocate their daily study time and proactively make appointments with teachers for Q&A. This effective integration of resources enables them to gradually overcome learning difficulties, thereby enhancing their confidence and motivation in learning. Conversely, if students have strong metacognitive ability but weak resource management

skills, such as disorganized time arrangement and poor use of external learning resources, even if they can clearly recognize the requirements of learning tasks and their own cognitive level, they will still find it difficult to advance their learning due to improper allocation of external resources, resulting in the failure to achieve learning goals on time. Ultimately, this will weaken the positive influence t of metacognitive ability on learning motivation.

5.Conclusion

Metacognitive ability of college students has a significant positive influence on learning motivation. Among them, metacognitive knowledge provides cognitive basis for the formation of learning motivation. Metacognitive monitoring reinforces learning motivation through feedback regulation, and metacognitive regulation maintains learning motivation through goal optimization. Learning strategies have regulating effect on the influence of metacognitive ability on learning motivation among college students. Specifically, the effective application of cognitive strategies, metacognitive strategies and resource management strategies can all enhance the positive influence of metacognitive ability on learning motivation. Students' lack or improper application of learning strategies will weaken this positive influence.

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