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A Review on the Impact of Mathematics Learning Effectiveness and Learning Motivation among Undergraduate in Shaanxi, China

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ABSTRACT: This article conducts a literature review on factors influencing undergraduate mathematics learning in Shaanxi Province, China. This paper mainly discusses the impact of mathematics learning effects and learning motivation on academic performance of undergraduate students in Shaanxi Province, China.

KEYWORDS: Mathematics Learning, Learning Motivation, Learning Effectiveness, Undergraduates.

I. INTRODUCTION

This article conducts a literature review on factors influencing undergraduate mathematics learning in Shaanxi Province, China. This paper mainly discusses the impact of mathematics learning effectiveness and learning motivation on academic performance of undergraduate students in Shaanxi Province, China.

Since the main research subjects of this study are undergraduates from colleges and universities in Shaanxi Province, there are regional differences in the impact of undergraduates on mathematics learning. Taking college undergraduates as an example, the article explores the meaning of mathematics learning, effectiveness of mathematics learning, motivation for mathematics learning, influencing factors of mathematics learning, and the interaction between mathematics learning effectiveness and learning motivation.

Courses such as "Advanced Mathematics" and "Linear Algebra" are important basic courses for students majoring in science and engineering in Chinese colleges and universities, and are also basic subjects for graduate examinations in engineering, science, and finance. Courses such as "Advanced Mathematics" not only lay the foundation for students' subsequent course study and research, but also cultivate students' scientific qualities such as rigorous logic and clear expression. However, mathematics courses are characterized by high abstraction, strict logic, and wide applicability. Students often find difficulties in the learning process, and thus easily lose interest and motivation in learning [20], leading to stagnation in mathematics learning. University undergraduates perform worse.

In today's world, science and technology are developing rapidly. Information technology represented by computer technology is rapidly changing everything around us with its unique penetration and affinity. Mathematics is the basis of computers. Therefore, in the teaching process of mathematics courses, we make full use of various teaching methods and information technology, and adopt a variety of teaching methods to effectively mobilize students' learning enthusiasm[21]. Students' passive acceptance of knowledge changes to active learning and participation in the teaching process. These measures have improved the monotonous and boring traditional Chinese teaching model of "blackboard + chalk" to a certain extent, and improved students' mathematics learning effects. It is worth pointing out that the effective evaluation of mathematics learning effects is also an important part of the entire teaching work. It not only directly affects the cultivation of school talent quality, but also is directly related to the school's educational level. Therefore, many domestic scholars have conducted research on learning effects[4],[5]],[20].

Many scholars have mentioned that excellent mathematics learning must have good career prospects. Mathematics learning can help students improve their logical thinking abilities, develop abstract thinking abilities, and enhance personal creative thinking abilities. However, many students face difficulties when learning mathematics, and the learning difficulty is relatively high [18], which means that undergraduate mathematics learning is very challenging and creative. Mathematics is a very important basic subject.

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College mathematics courses, including advanced mathematics, linear algebra, probability theory, etc., have an important impact on practitioners in many industries. For example, R&D personnel in the computer industry, machinery manufacturing industry, and financial industry practitioners need a solid mathematical foundation. . Mathematics is a subject that transcends national boundaries. It is an important language around the world because it is the result of pure, abstract and extremely refined thinking. Moreover, the application fields of mathematics, such as finance, transportation, technology, urban planning, health care, etc., affect 100% of the world's population. Therefore, exploring the related influencing factors of mathematics learning is of great significance for improving mathematics learning efficiency and learning motivation[39].

II. MATH LEARNING

Mathematics is an important part of basic education and plays an important role in cultivating students' logical thinking ability, problem-solving ability and innovative thinking. However, the effect of mathematics learning is affected by many factors, among which learning motivation is an important factor.

Research by Hu [11] and others found that a closed living and social environment affects students' learning motivation and enthusiasm, and the intersection of home rest and home learning environment also makes it difficult for students to concentrate. In addition, the research on the impact of learning motivation on academic performance is roughly reflected in two aspects: one is the research on the direct impact of learning motivation on academic performance; the other is the research on the impact of learning motivation on academic performance. Secondly, study the indirect effects of learning motivation on academic performance through other factors such as effort level and learning strategies.

The personal factors of current college students have a great impact on learning results, including intellectual factors, emotional factors, cognitive styles, etc. Research can strive to stimulate students' learning motivation, increase learning investment, and continuously improve students' learning effects.

2.1 MATHEMATICAL UNDERSTANDING

In the exploration of "the impact of undergraduate mathematics learning effects and learning motivation in Shaanxi Province", it is crucial to understand the nature of mathematical understanding. This chapter delves into aspects of understanding mathematics, including the cognitive processes involved, the factors that influence understanding, and their significance in the context of our study.

Mathematics is the study of concepts such as quantity, structure, change, space, and information. Mathematics is a universal means for humans to strictly describe the abstract structures and patterns of things, and can be applied to any problem in the real world. All mathematical objects are inherently human-defined. In this sense, mathematics is a formal science[17]rather than a natural science. Different mathematicians and philosophers have different views on the exact scope and definition of mathematics. Pythagoras said that mathematics rules the universe, and Gauss said that mathematics is the king of science.

Questions like "what is mathematics" should be considered by mathematicians. As mathematics educators and researchers, teachers need to understand mathematics from the perspective of college mathematics teaching [40]in order to truly understand the essence of mathematics and apply it to teaching practice. Excellent mathematics education is the cultivation of people's rational thinking quality and critical thinking ability. It is the enlightenment of intelligence and wisdom, the development of latent initiative and creativity. It has a great impact on the quality of people. It can make a person a fuller, richer, and stronger person.

2.2 UNIVERISITY MATHEMATICS COURSES

What is university mathematics? Here is a brief introduction to some of the main mathematics courses that undergraduates need to take. University mathematics is a mathematics subject at the higher education level that typically covers a wide range of mathematical concepts, principles, and techniques and is designed to provide students with in-depth mathematical knowledge and problem-solving abilities. University mathematics typically covers the following major areas:

1). Calculus: Calculus is a core branch of mathematics involving concepts such as functions, limits, derivatives, and integrals. It is used to study the properties of changes and curves and is fundamental to many fields of science and engineering.

2). Linear Algebra: Linear algebra is the study of vectors, matrices, linear transformations, and the algebraic structure of space. It has wide applications in computer graphics, engineering, physics and other fields.

3). Discrete Mathematics: Discrete mathematics covers concepts such as discrete structures (such as graph theory and set theory), logic, permutations, and combinations. It plays an important role in computer science and information technology.

4). Differential equations: Differential equations are used to study phenomena that change over time. It is widely used in physics, engineering, and biology to model and solve real-world problems.

5). Probability Theory and Statistics: Probability theory involves the study of random events and uncertainty, while statistics involves data analysis and reasoning. They play an important role in scientific research, business analysis, and social sciences.

6). Mathematical proof: Mathematical proof is an important skill in mathematics and involves the use of strict logic and reasoning to prove mathematical propositions. It is key to learning and understanding mathematics.

The study of college mathematics not only helps develop abstract thinking, problem-solving skills, and logical thinking, but also provides students with the mathematical foundation needed in many career fields. The subject has wide applications in science, engineering, economics, computer science and other fields. As such, it is a required course in many universities and colleges, providing not only mathematics majors with in-depth mathematical knowledge, but also mathematical literacy for students in other majors.

2.3 THE REALITY OF UNDERGRADUATE MATHEMATICS LEARNING

The reason why the researcher is interested in this study is based on the researcher's review of his mathematics learning situation at Shaanxi University and his understanding of the learning situation of the undergraduates around him after becoming a teacher. Research has found that current college students in different grades and grades have problems such as low mathematics learning effectiveness, weak learning motivation, and learning burnout.

Undergraduate students often engage in bad behaviours such as being late, skipping classes, and taking substitute classes in their daily study life. They also have a clear attitude towards procrastination and negative sabotage of learning tasks. Although some students "sit upright" in class, what they read is not the textbooks of mathematics major courses, but their mobile phones and tablets [42]. What I learned was not knowledge related to professional courses, but popular variety shows and Korean dramas. What I heard in class was not the teacher's teachings, but popular trendy music. Moreover, I just slept on the table in the classroom, thinking about what to eat next and how to form a good habit. Teaming up to play games, etc., as well as not studying at ordinary times.

As the final exam approaches, it is not uncommon for undergraduates to stay up late to prepare for the final exam, and use the slogan "Six hundred thousand years to waste another point" as their goals for the final exam and final study. results [37]. Although these behaviours only exist among some undergraduates, difficulty learning mathematics is a problem faced by many college undergraduates.

As educators, we have to pay attention and think about why these undergraduates have difficulty learning mathematics, low learning efficiency, and low motivation, which directly affects the learning of subsequent professional courses. This is a vicious cycle. It has to be said that the mathematics learning situation of undergraduates is worrying, and it has also aroused researchers' curiosity about the learning situation of undergraduates in Shaanxi Province. Responsibilities as an educational researcher are driven by curiosity and therefore have a high research interest in undergraduate mathematics learning issues.

The researcher hopes to take 6 students from University X as an example. Use cases to explore and present the process of specific problems they encountered in mathematics learning, as well as the specific symptoms of these problems. Through interviews, we will delve into the reasons for the problems of these six students and find corresponding countermeasures. On this basis, these strategies are used to help undergraduate students solve relevant problems.

The university stage is an important stage for learning knowledge. In these precious four years, students' knowledge accumulation increases exponentially; if at this stage, students do not have a clear grasp of themselves and have no intention of following the crowd, they will become more and more familiar with mathematics in the future learning process. Learn to lose confidence, avoid learning, or even be afraid of learning.

Therefore, for college undergraduates, establishing a firm belief in mathematics learning and a correct attitude towards mathematics learning at the beginning of enrollment [9] is not only conducive to forming a good mathematics learning cycle, but also conducive to improving mathematics learning ability.

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understanding of what has been learned. Confidence in knowledge is also very conducive to the development of a person's mental health and is the prerequisite for effective learning in which the body and mind are integrated; students' good learning motivation also has a good promotion effect on the teaching activities of the School of Mathematics, which is conducive to improving the teaching quality of teachers and the school. level of education. It also has a very profound impact on the learning of knowledge in the entire society, and is more conducive to the country's talent output and educational development. As the saying goes: "When talents thrive, education thrives; when talents thrive, everything fails." Without good mathematics learning efficiency and motivation, everything is empty talk.

III. MATHEMATICS LAARNING EFFECTIVENESS

3.1 MATHEMATICS LAARNING EFFECTIVENESS AND MATHEMATICS LAARNING ATTRIBUTION

Attribution theory is a modern American theory that looks at motivation with the concept of cognition. This theory has opened up a new way to solve the problem of individual differences in education today and has a positive role in promoting the deepening of teaching reform. Learning motivation refers to the psychological process that enables students to maintain their current learning activities.

Undergraduate students are prone to unclear learning goals, incorrect attributions, and emotional instability in mathematics learning. In undergraduate mathematics learning, teachers are required to understand the characteristics of students' development and cognitive laws in teaching[28]. The purpose is to stimulate students' learning efficiency and interest in learning, maintain correct learning motivation, and achieve true teaching significance. Therefore, it is very necessary to introduce attribution theory into mathematics teaching to improve traditional mathematics teaching methods and optimize the relationship between teaching and learning.

Ability attribution: Attributing the cause of a mistake to one's lack of ability. For example, "I don't know how to understand Lagrange's theorem. The math problem is so difficult, and I always get it wrong. I don't have the talent to learn mathematics." If the correct solution is attributed to ability, such as "It's so simple, my understanding of mathematics If you have very good abilities, your self-confidence will be strong , your learning effectiveness will be improved, and you will be willing to learn mathematics."

Effort attribution: Attribute mistakes to effort, such as "I probably didn't try to memorize it several times, so I won't do this question. I have to remember clearly this time so I won't make mistakes next time."

Attribution of luck: attribute the error to "it was my bad luck this time, I didn't see the question, it doesn't matter if I made a mistake, I will read the question carefully next time, just pay attention next time." attribute the correctness to luck, if "I happened to see this question in the book yesterday, and I just passed the test today. I am so lucky. It seems that it is necessary to gamble on some questions." Usually, it will cause students to stop studying hard. In this question, some students attributed the error to ability, some attributed it to luck, and some attributed it to hard work. Students who attribute it to ability will have a slight sense of inferiority in their hearts, their attitude is negative, and their learning efficiency is not high. Students who attribute it to luck will think that they can get it right based on their unique way of doing the questions, and will not study hard in the future. Students who attribute it to hard work are more correct. They think that they have not mastered enough knowledge, so they will study harder next time.

[8]Chen and Xu [35]found through research that when students fail in learning, they usually first attribute the failure to external factors such as task difficulty and luck. Although self-esteem is protected to a certain extent. It is also impossible to objectively reflect on one's rights, which may lead to "learned helplessness" in the long run. Mathematics learning efficacy refers to students' confidence in whether they succeed in solving mathematical tasks and problems, as well as their situational and problem-specific judgments.

[30]Mathematics learning effectiveness affects the individual's choice of mathematics learning tasks, hard work, and persistence in mathematics learning under difficult conditions [15] affects the individual's way of thinking and attribution, and then affects behavioural achievements [16]. As a sense of self-efficacy for estimating and judging one's learning ability, it reflects a kind of self-confidence and expectation of students for their learning This kind of self-

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confidence and expectation has a very important effect on students. It not only affects the level of students' application of learning strategies in the learning process, but also affects the degree of effort of students in learning, their persistence in the face of learning difficulties, and their enthusiasm for learning. These aspects will have a certain impact on students' learning activities and learning effects.

[31]Many studies in recent years have shown that mathematics learning effectiveness has an important self-regulatory effect on students' mathematics learning and is also significantly related to mathematics learning motivation, mathematics failure attribution, mathematics learning reflectivity, and mathematics academic achievement. For example, (Xiong et al.,2023) it was found through research that students' academic feedback will affect students mathematics self-efficacy, and appropriate academic feedback can help students improve their mathematics self-efficacy. The research results of Fu Lei [10] show that there is a significant positive correlation between self-effectiveness and learning motivation. Based on the above literature review at home and abroad, it is evident that there is something to be observed. There is still a lack of systematic research on the relationship between the four elements of mathematics learning motivation, mathematics failure attribution, mathematics learning reflexivity, and mathematics effectiveness.

3.2Teacher-Student Relationship and Mathematics Learning Effectiveness

Math anxiety is defined as an emotional reaction to mathematics in which students react negatively to mathematical concepts and tests [7]. Therefore, math anxiety is a feeling of nervousness, helplessness, and distress that interferes with the ability to concentrate, thereby affecting math learning effectiveness[38].

Mathematics anxiety is an emotional experience of physiological changes and anxious states such as anxiety, tension, and fear when an individual processes numbers, uses mathematical concepts, learns mathematical knowledge, or takes a math test. It has an important impact on students' performance. (Jain et al., 2019) Mathematics anxiety includes mathematics test anxiety, mathematics learning anxiety mathematics problem-solving anxiety, etc. It is an important factor affecting mathematics learning and also affects students' self-efficacy. A comparative study in Malaysia and Tanzania by Mohamed and Suero [22].

Institutions of higher education reveal an inverse relationship between mathematics anxiety and performance, with anxiety having a significant impact on achievement. Because anxiety is related to students' learning effectiveness. The level of mathematics learning effectiveness is worth investigating the anxiety level of students at all levels of education.

[16]Liang found that mathematics learning strategies can indirectly predict mathematics performance through the mediating effect of mathematics anxiety.[5] Mathematics is the basis for engaging in STEM-related occupations. Therefore, mathematics anxiety not only affects an individual's current academic achievement in mathematics but also affects their future career choices. Mathematics learning effectiveness is an individual's self-confidence evaluation of whether he or she can complete mathematical tasks or solve mathematical problems in a specific situation. It directly affects the choice of learning strategies, and the degree of mathematics learning efficacy is closely related to the degree of effective use of metacognitive strategies. Students give full play to the role of cognitive strategies in learning, which helps to monitor and adjust the degree and direction of their efforts, thereby improving learning efficiency and mathematics learning effectiveness.

Metacognition refers to people's understanding of their cognitive ability, which has the functions of self-awareness and self-monitoring. To sum up, students' academic achievement in mathematics is affected by factors such as mathematics anxiety and mathematics learning effectiveness, but there are few studies involving the interaction between these factors.

Since the 21st century, the research on mathematics learning anxiety has attracted the attention of academic circles, but relevant research, especially more in-depth empirical research, has mainly focused on primary and secondary schools [41]. For example, mathematics learning anxiety of primary school students significantly negatively affects their mathematics learning effectiveness, and interest in mathematics learning is one of the main causes of mathematics anxiety [23]. Since the development of students' cognitive abilities and the accumulation of learning experience may lead to the development of a subjective understanding of mathematics anxiety, it would be simplistic to directly transfer the research conclusions of primary and secondary schools to the college mathematics learning of college students. This is why the researcher write this article.

The direct impact of college mathematics learning anxiety on learning motivation is not significant, which is inconsistent with existing research [3]. The reason may be that the existing

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research mainly focuses on the general learning of adolescents, and does not focus on advanced mathematics learning. Compared with general learning materials, advanced mathematics has a higher degree of abstraction. If you do not understand the essence of mathematical objects, it is difficult to achieve better learning results (Barroso et al., 2021). This may lead to the conclusion that the relationship between learning anxiety and learning motivation is not significant. On the other hand, when students are driven by external forces, they are more likely to feel nervous and anxious [1]. However, the researchers focused on the internal motivation of college students to learn advanced mathematics, so they got the result that the effect was not significant[36].

The results of the mediating effect analysis showed that learning anxiety in advanced mathematics was negatively affected by learning interest, and at the same time negatively affected self-efficacy. This is consistent with the existing research results on primary school students or secondary vocational students[32][41], and also reflects the common characteristics of the influence paths of related dimensions. In other words, in another path in which interest in higher mathematics learning indirectly affects learning motivation, learning anxiety and self-efficacy constitute a chain intermediary, and students need to be helped to moderately reduce anxiety to increase the level of self-efficacy, thereby improving mathematics learning effectiveness.

In October 2018, the "Opinions on Accelerating the Construction of High-Level Undergraduate Education and Comprehensively Improving Talent Cultivation Ability" issued by the Ministry of Education of China pointed out that it is necessary to "increase the proportion of process assessment results in the total course score". In the practice of college mathematics teaching, process assessment can promote students' learning, and it can also predictably relieve learning anxiety. After a semester of advanced mathematics study, students are faced with the final exam of "complete all their achievements in one battle", and the situation of test-taking anxiety is relatively serious.

The level of test-taking anxiety in advanced mathematics is much greater than classroom learning anxiety. It is necessary to decompose and buffer test-taking anxiety in course examinations through substantive process assessments, such as answering teachers' questions, completing quizzes in class, participating in class discussions, sharing learning feelings, etc. Make reasonable assignments. The weighted calculation in the comprehensive evaluation makes students realize that the grade evaluation of the course is not just a final exam paper, but also comprehensive feedback on their university mathematics learning. In the process of completing various daily learning tasks, the anxiety about the final course exams is gradually reduced, and the sense of mathematics learning efficacy and learning motivation are improved.

IV. MATHEMATICS LEARNING MOTIVATION

4.1 INTRINSIC AND EXTRINSIC MOTIVATION FOR MATHEMATICS LEARNING

As far as the classification of learning motivation is concerned, Bruner, an American educational psychologist, divides learning motivation into intrinsic motivation and extrinsic motivation. According to Houle, there are three types of orientation: goal orientation, activity orientation, and learning orientation. There are also Sheffield's five types, Boshier's six types, and Burgess's seven types. Domestic scholars usually divide learning motivation into two dimensions: endogenous motivation and exogenous motivation. Exogenous motivation means that the behaviour of completing learning is for the result of learning rather than learning itself, such as social needs, external expectations, material Earning, and diploma improvement.

Endogenous motivation means that learning is to enjoy the sense of accomplishment brought about by the process of learning itself, including personal value motivation and so on. From the existing research literature, it is concluded that scholars have agreed on the definition of learning motivation, that is, the internal motivation mechanism for individuals to produce and maintain external behavioural efforts to meet internal needs. The paper is also based on this definition.

Intrinsic motivation in mathematics learning is related to interest and desire to learn. If students are intrinsically motivated to learn mathematics they will have the desire to do so after finding it interesting. Motivation is the internal driving force of mathematics learning, that is, intrinsic motivation. According to the OECD 2012 PISA results (2013), intrinsic motivation influences student engagement, career choice, and performance. Therefore, it is crucial to study motivational variables related to attitudes and achievement. Recognize perceived usefulness. Perceived usefulness refers to students' perception of the importance of things. Mathematics in current everyday life and the future (Adelson & McCoach, 2011), Perceived usefulness Mathematics learning is believed to influence students' attitudes towards the subject. If students recognize the importance of mathematics in their lives, they will be motivated to learn, practice, and learn about mathematics topics [27]. The study also showed that despite most of the students' negative emotions about mathematics they showed positive perceptions about mathematics. This demonstrates students' awareness of the value of mathematics to their lives and future careers. The study by Sun(Sun et al. ,2020) found that the practicality of mathematics was a positive predictor of success. Therefore, it is worth studying the relationship among mathematics motivation, mathematics values, attitude, and learning effectiveness.

[4][28][39]Zhang Dongmei, Wang Xingang, and Gao Xuefen designed a graded questionnaire on factors affecting learning motivation and conducted tests on randomly selected students from Zhejiang X University. Statistical analysis was performed on the obtained data and a factor model was established to determine comprehensive motivation, supervision and management, work and environmental motivation. and achievement are the common factors of the four motivational influencing factors. Finally, it was concluded that comprehensive motivation, that is, insufficient intrinsic motivation, is the main reason affecting college students' learning motivation [42].

Cao Ying (2020) learned about the current situation of college students learning motivation through questionnaires and interviews and found that the overall learning motivation of college students is on the decline. After analysis, they summarized the influencing factors of the decline in college students' learning motivation as follows: Four factors: self, family, school, and society. The main internal factors are poor adaptability, immature thinking, and poor self-control[6]. Family factors are mainly because parents have relaxed their concern for their children's learning. School factors are mainly school spirit, school facilities, and teachers. Social factors include the increasing abundance of online media, which distracts college students' attention and enthusiasm for learning [14].

Generally speaking , college is a special period or stage, and the factors that affect college students' learning motivation are complex and diverse. Different influencing factors can be summarized from different dimensions. Strategies to maintain or improve motivation to learn.

4.2 INFORMATION ANXIETY AND MATHEMATICS LEARNING MOTIVATION

In the era of the Internet of Everything, information has become an important factor that determines social productivity and affects economic and social development. With the explosive growth of information, a state of stress often occurs when users cannot access information, understand information, or utilize necessary information, that is, users have information anxiety[3].

Information anxiety has a greater impact on college students who are in the ocean of knowledge and need to read and study extensively. Insufficient individual cognitive levels, conflicts and differences between different information, improper information processing methods, and other problems lead to information anxiety among college students, which also leads to blindness, discomfort, and confusion about learning [13]. Information anxiety generated during the interaction between individual cognition and the environment [15] largely affects the learning motivation of college students. Therefore , given the current situation that the overall learning motivation of college students is not strong[14], it is of positive significance to study the causes of college students' information anxiety and analyze its impact on college students' learning motivation for exploring effective ways to stimulate college students' learning motivation.

The research on college students' information anxiety mainly revolves around the definition of information anxiety and the analysis of its causes. Cao and other researchers believe that information anxiety is a series of complex emotional states such as tension and anxiety caused by various reasons in information activities [4]. In terms of the analysis of the causes of information anxiety, Rong Yihong et al. believe that the causes of information anxiety mainly come from the quantity, quality, and filtering interface of information. Zhang Yanfeng and others summarized the causes of information anxiety into two aspects, including the individual level as well as the information level [40]. In addition to the user's own individual factors and information resource factors, external factors such as the information technology environment are also the main reasons for information anxiety[37]

Generally speaking, most of the research on information anxiety focuses on the concept and causes of information anxiety itself, and there are few studies on the causes of information anxiety and its relationship with learning motivation in college students. In terms of learning motivation research, there are mainly studies on the structure, measurement methods, and influencing factors of college students' learning motivation. [5]Gao et al. divided the motivation of college students in English learning into 7 kinds of motivations: “intrinsic motivation” and “extrinsic motivation”.

CHEN et al. used SPSS 22.0 and AMOS 24.0 as auxiliary tools to construct an impact path model and analyzed the relationship among college students' learning motivation, self-efficacy, learning environment, and learning behavior[8]. [11]Hu analyzed the influencing factors of learning motivation from both internal and external aspects, including three internal factors of learning needs, cognitive conflict, and goal awareness, and three external factors of incentives, reinforcement, and environment.

The study found that the influencing factors of college students' learning motivation can be divided into two aspects: internal and external [22]. In general, from the perspective of research trends, foreign research on information anxiety and learning motivation started earlier and has gone through the initial concept definition, connotation analysis, and research on the form of expression and compositional dimensions, to the status quo investigation, cause analysis, and influencing factors.

Research, and then gradually expand to the analysis of variables and the relationship between variables in specific scenarios. From the perspective of the research methods used, the research methods in the field of information anxiety and learning motivation at home and abroad mostly use research methods such as questionnaires, and gradually shift from the initial broad theoretical research to practical research. At present, there are few studies on the relationship between information anxiety and learning motivation. To solve the problem of low learning motivation college among students, this study takes college students as an example to explore related issues from the causes of information anxiety.

Due to the quality and quantity of information acquisition channels and the difficulty of information acquisition, intrinsic learning motivation is the tendency of college students to learn for challenging curiosity, interest, etc., and college students' intrinsic challenging curiosity, interest, and information acquisition The degree of mutual influence between external objective environments is relatively small [29]. Therefore, in the empirical test, the influence of information acquisition anxiety on endogenous learning motivation is not significant. In addition, information use anxiety is caused by problems in the information use environment such as poor computer conditions, poor network conditions, and social environment [21]. Compared with other types of information anxiety, this part of anxiety can be alleviated more easily and quickly. For example, information anxiety caused by poor network conditions can be solved by changing the network access. Therefore, information use anxiety will not have a significant impact on learning motivation [20]. Therefore, the conclusion of empirical research shows that information use anxiety The effect on learning motivation is not significant.

Regarding the weakening of learning motivation caused by college students’ information acquisition anxiety, a survey shows that 80% of college students will encounter paid information when acquiring information and searching for information, thus spending a lot of time and energy looking for free information acquisition methods [25], resulting in reduced motivation to learn or continue learning. In addition, due to the messiness of information, the quality of information acquisition channels that college students come into contact is poor, and the information acquisition process is complicated, which will lead to the weakening of college students' learning motivation.

V. CONCLUSION MATHEMATICS LEARNING MOTIVATION AND MATHEMATICS LEARNING EFFECTIVENESS

The indirect impact of higher mathematics learning interest on learning motivation is reflected in two paths. In one path, self-efficacy exists as an independent mediator variable, and for every standard deviation increase in learning interest, self-efficacy will increase by 0.381 standard deviations. For every one standard deviation increase in self-efficacy, learning motivation will increase by 0.822 standard deviations. The former is similar to the existing research results (Zhang et al., 2021) (Li, 2022) (Luo , 2023), reflecting that the impact of mathematics learning interest on self-efficacy is across school stages, and it is universal in different stages of mathematics learning. The latter shows that mathematics learning efficacy has a significant impact on learning motivation, especially intrinsic motivation. The effect of mathematics learning efficacy on learning motivation can predict students' classroom learning behavior (He et al., 2018) (Erdogan, 2019).

The influence of advanced mathematics learning interest on intrinsic motivation is mainly exerted through self-efficacy. Encouraging and helping students to form a positive and controllable self-efficacy, rather than a negative and resigned self-efficacy, will be able to achieve this effect improvement. For example, when correcting students' higher mathematics homework, it is important to use individual longitudinal progress as an evaluation indicator instead of just evaluating according to the preset unified standard. Understand the missing factors of different students' higher mathematics learning efficiency, teach students in aptitude and prescribe the right medicine; help students establish self-success expectations for higher mathematics learning through positive teacher feedback, and realize the positive effect of improving mathematics learning motivation (Fu, 2019) mentality.

Among the three factors that have an impact on mathematics learning efficacy, mathematics learning motivation, and mathematics learning reflectivity have a significant positive impact on mathematics learning efficacy, while mathematics failure attribution has a significant negative impact on mathematics self-efficacy role (Lan, 2019).

This conclusion is consistent with the research conclusions of Fu，Zhang, and Chen (Fu, 2019), (Zhang et al., 2022), (Chen et al., 2020). Mathematics learning motivation is the conscious behavior tendency of students in the process of mathematics learning. Good mathematics learning motivation can motivate students to take action and effort to achieve certain mathematics learning goals, and it is also conducive to enhancing students' confidence in solving mathematical problems or completing mathematical tasks. Heart, improve mathematics self-efficacy.

As important indicators to measure students' mathematics learning status and activity quality, mathematics learning motivation, mathematics learning effectiveness, and mathematics failure attribution can comprehensively reflect students' true psychological state in the process of mathematics learning (Hu, 2021). Based on this, studying the relationship between the three psychological elements of mathematics learning motivation, mathematics learning effectiveness, and mathematics failure attribution can provide valuable suggestions for teachers' mathematics teaching management, thereby promoting the development of students' core literacy and embodying morality. Tree people education concept.

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