

Psychological Attribution and Educational Intervention Strategies for Mathematics Learning Difficulties of Economics and Management Students in Colleges and Universities

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Abstract: This paper aims to explore the difficulties encountered by college students majoring in economics and management in mathematics learning, their causes, and propose corresponding solutions. By analyzing the characteristics and current situation of mathematics learning among economics and management students, this paper deeply examines the causes of mathematics difficulties from the perspectives of students' own factors, teaching factors, and discipline characteristics. Targeted strategies such as improving students' learning attitudes, optimizing teaching methods, and strengthening discipline integration are put forward, hoping to provide useful references for mathematics teaching of economics and management students in colleges and universities, help students overcome mathematics difficulties, improve their mathematical literacy, and lay a solid foundation for in-depth learning of economics and management majors.

Keywords: Mathematics learning difficulties; Psychological intervention



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“Students with mathematics learning difficulties” refer to those who have normal intelligence but consistently achieve mathematics scores below the passing line (usually 60 points) and have significant cognitive or emotional obstacles. The “students with mathematics learning difficulties” among college students majoring in economics and management referred to in this paper are those with a relatively high detection rate in undergraduate economics and management majors, especially in abstract modules such as functions and calculus. Their core obstacles are insufficient mathematical application ability and the disconnection of professional value recognition, and the core path is the anxiety-avoidance cycle, namely: exam failure → intensified anxiety → behavioral avoidance → declining grades. In severe cases, this cycle leads to comprehensive learning weariness and refusal to study, decreased self-efficacy, and even serious psychological problems such as anxiety, depression, and social sensitivity.

1 Main Causes of Mathematics Learning Difficulties of “Students with Mathematics Learning Difficulties” Majoring in Economics and Management in Colleges and Universities

1.1 Differences between Arts and Sciences

The mathematics curriculum for economics and management majors in Chinese ordinary colleges and universities is basically unified, covering basic modules such as calculus, linear algebra, and probability and statistics. Economics and management majors account for the highest proportion of majors that admit both arts and science students in colleges and universities. When students from arts backgrounds enter economics and management majors (such as economics, finance, and management), although they have advantages such as broad thinking, expressive ability, and humanistic literacy, a considerable number of them often face unique challenges in mathematics learning. Moreover, some professional courses have a strong mathematical dependence. For example, in economics courses, there are utility function optimization in intermediate microeconomics and dynamic models in macroeconomics; in management, operations research requires linear programming modeling, and econometrics requires regression analysis and derivation.

1.2 Differences between College and High School Mathematics Learning Content

High school mathematics mainly focuses on “visible” calculations such as functions, sequences, and solid geometry. However, college mathematics, including the limit ε - δ language, linear space, and probability axiomatization, requires the translation of intuitive experience into symbolic logic. For some students who are not yet prepared, this will bring a great psychological impact, leading to “symbol phobia”. The brain may misjudge abstract symbols as threats, thereby triggering avoidance behaviors.

1.3 Peer Differences and Peer Pressure

Colleges and universities enroll students nationwide, so there are significant differences in mathematics foundations among students. Many interviewees reported that they began to doubt themselves after seeing others solve problems faster. A student majoring in finance and taxation encountered difficulties in calculus learning and sought help from a roommate, only to find that the roommate had already learned this content in the second year of high school. This student immediately had the idea of completely denying himself, began to hate mathematics, and believed that he was completely incapable of learning this major.

1.4 Differences in Teaching and Classroom Management Methods

There is a “discontinuous” difference between college mathematics teaching and high school mathematics teaching. This difference is not only reflected in the depth and breadth of knowledge but also in dimensions such as teaching objectives, curriculum rhythm, learning methods, and evaluation systems. At the same time, the high supervision mode of school teachers and parents in high school disappears. As a result, many students experience a chain reaction of “mathematics anxiety, sudden decline in motivation, and academic setbacks” in their first year of college if they are not careful.

2 Joint Intervention Process-A Case Study

The essence of intervening in mathematics learning difficulties is to guide students to achieve three levels of awakening: cognitive awakening - replacing “I am doomed to fail” with “I can learn”; value awakening - insight into the value of mathematical thinking for individuals and society; life awakening - transforming adversities into a training ground for psychological resilience. The specific intervention process of this case study is as follows:

2.1 Basic Information of the Case

Name: Zhang (pseudonym)

Grade/Major: Sophomore, Business Administration

Reason for Seeking Help: Persistent low mood, insufficient learning motivation, confusion about the future, accompanied by insomnia. The total weekly study time was less than 10 hours, and he had a strong sense of self-loathing. He failed the final exams of Calculus and Probability Theory, and currently feels unable to understand the content of mathematics courses and mathematics-related courses in class.

2.2 Initial Assessment: Psychological Evaluation Using Professional Scales and Interviews

Case Conceptualization: Zhang’s core problem was the decline in self-efficacy caused by academic setbacks, especially in mathematics-related courses, which further led to anxiety, depression, learning avoidance behaviors, and an identity crisis regarding his major and career future. This is a typical case where academic problems lead to psychological issues, requiring comprehensive intervention measures.

Table 1 Initial Problem Assessment Form

Assessment Dimension	Assessment Tools	Main Findings and Problem Manifestations
Emotional State	SAS (Self-Rating Anxiety Scale)	SAS standard score: 65 (moderate anxiety tendency)
	SDS (Self-Rating Depression Scale)	SDS standard score: 68 (moderate depression tendency)
Cognitive Concepts	ABC Model Analysis; REBT (Rational Emotive Behavior Therapy)	A (Activating Event): Failed the Calculus exam; could not understand the content of Intermediate Microeconomics. B (Irrational Beliefs): ① “I failed the exam, which proves that I am not suitable for studying business at all, and my life is over.” (Catastrophizing) ② “Other students find it easy, only I can’t learn it. I’m too stupid.” (Overgeneralization/Low Frustration Tolerance) C (Emotional and Behavioral Consequences): Anxiety, depression, avoidance of learning, self-deprecation.
Behavioral Performance	Behavior Log; Self-Monitoring	Avoidance Behaviors: Began to skip classes, especially mathematics-related courses; delayed homework. Negative Behaviors: Irregular work and rest (staying up late to play games or watch short videos, and feeling listless during the day), forming a vicious cycle.
Social Support	SSRS (Social Support Rating Scale)	Low social support. Due to poor self-perception, he was unwilling to communicate with classmates for fear of being looked down upon; he had little communication with his parents, who only provided financial support and lacked emotional communication.
Academic and Career	Transcript Analysis	Generally low scores in mathematics-related courses; passed Advanced Mathematics after a make-up exam, but failed Calculus.
	Career Interest Assessment (Holland Interest Island)	Strong interest in “enterprising” (E) and “social” (S) activities; likes interacting with people and participating in organizational activities.

3 Plan Formulation: Four-Dimensional Joint Intervention

Based on the assessment results, a 12-week personalized counseling plan named “Ice-Breaking Plan” was jointly formulated with Zhang, involving intervention from the following four dimensions:

3.1 Cognitive Adjustment

Analyze catastrophic thinking and break the logical chain of “inability to learn mathematics = life failure”. Use CBT (Cognitive Behavioral Therapy), evidence verification from previous cases, to help students identify absolute beliefs such as “incompetence in mathematics” and “my college life is ruined”, and establish a growth mindset.

3.2 Emotional Management

Learn relaxation training methods such as abdominal breathing and meditation, and conduct gradual exposure to classroom and exam scenarios to reduce the overactivation of fear emotions.

3.3 Behavioral Correction

Use methods such as the Pomodoro Technique and fear ladder exposure to help students formulate fragmented learning plans and launch systematic desensitization training. For example, conduct three 25-minute focused training sessions every day, block avoidance behaviors and strengthen the sense of control through error attribution forms and simulated exam adaptation training.

3.4 Motivation Reconstruction

Re-establish the connection between academic hardships and career value by re-recognizing and planning the major and career. For instance, broaden cognition and increase motivation to overcome difficulties through methods such as interviewing industry mentors or participating in internships.

4 Effect Evaluation: Dual-Track Verification of Quantitative and Qualitative Indicators

4.1 Changes in Quantitative Indicators

(1) The SDS score decreased from 68 before the intervention to 52 after the intervention (a decrease of 16 points), and the SAS score decreased from 65 before the intervention to 50 after the intervention (a decrease of 15 points), indicating that depression and anxiety were significantly alleviated.

(2) According to the record of weekly effective study time, the weekly study time increased from about 10 hours before the intervention to about 25 hours after the intervention, and learning avoidance behaviors were greatly reduced.

(3) Passed the make-up exam of Probability Theory (Volume 1), and passed the delayed exams of mathematics courses in this semester.

4.2 Qualitative Evaluation

(1) Cognitive Changes: Changed from “I am inherently unsuitable for learning mathematics” to “I can gradually master the mathematics required by my major through hard work”; changed from “inability to learn mathematics means inability to learn this major” to “I can find my comfort zone in this major”.

(2) Behavioral Changes: The rate of skipping classes decreased by more than 50%, and they took the initiative to form a study group.

(3) Professional Identity: Changed from “giving up on studies” to proactively formulating a learning and development plan.

5 Sustainable Support Mechanisms

5.1 Level of Mental Health Education and Counseling Center

(1) Follow-Up

Conduct monthly cognitive monitoring at the individual level (to prevent regression of thinking patterns) and continuously use tools such as “error attribution forms” to optimize learning strategies.

(2) Prevention

Offer the compulsory course *Mental Health of College Students* in the first year. In *Learning Psychology of College Students*, set up content such as “learning self-management strategies”, “stress management”, and “procrastination behavior management”, and provide special teaching for majors that require mathematics learning.

5.2 Department Level

(1) Admission Education for Freshmen

Provide admission education for freshmen, explaining the learning characteristics of the major and providing learning resources.

(2) Development of Learning Aids

Develop a *Self-Help Manual for Academic Difficulties* for the college, and offer relevant lectures or courses to explain the connection between the major and mathematical thinking.

5.3 Discipline Teaching and Research Office Level

(1) Development of Supporting Teaching Resources

Develop supporting MOOCs (Massive Open Online Courses) for preview and review, formulate hierarchical learning plans, and create error attribution templates.

(2) Establishment of Tutoring Teams

Set up a “Pioneer Navigator” Q&A team to provide centralized tutoring for students with mathematics learning difficulties.

6 Conclusions and Prospects

(1) The essence of mathematics difficulties is a triangular cycle of “ability doubt → anxiety → avoidance”. To break this cycle, it is necessary to implement a three-stage intervention: cognitive relaxation → behavioral activation → value re-endowment. The model of this case (assessment - cognitive behavioral intervention - resource connection) can be replicated to solve the common chain reaction of “academic setbacks - self-doubt - career confusion” among college students, especially providing a replicable psychological intervention paradigm for the discipline adaptation problems of students with arts backgrounds, and is particularly applicable to quantitatively intensive majors such as finance, taxation, economics, and business administration.

(2) The counseling for economics and management students who have difficulties in mathematics and subsequent professional learning cannot be limited to the psychological level. It must be closely combined with their professional characteristics and career planning to directly address the key issues and achieve practical results. For example, focusing on the key point of “career interviews” and using the real experiences of role models to break irrational beliefs is more effective than the persuasion of counselors.

(3) Limitations and Improvements: In the early stage of the intervention, insufficient attention was paid to Zhang’s work and rest problems. In similar cases in the future, “sleep hygiene” education can be incorporated into the behavioral activation plan earlier.

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