

Research on the Employment Situation of College Mathematics Major Students in China

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ABSTRACT

With the rapid development of higher education and the increasing number of college graduates each year, it is of great significance to research the employment problems of college graduates majoring in mathematics. This research uses the literature analysis method to discuss the research on the employment situation of college graduates majoring in mathematics in the past in China. The results show that: (1) Almost research focused on three aspects: the employment status, its affecting factors, and the cultivation strategies to prompt graduates' employment. (2) There are obvious deficiencies in some places. Such as research methods. In the past, most researches have adopted the method of theoretical speculation, and few empirical methods have been used, which has greatly reduced the credibility of the research results. (3) There are also some blank spots in previous research. For example, there are rare types of research on the development of mathematical ability and innovation ability of mathematics students based on the employment perspective, and almost no research on how to establish an employment ability evaluation mechanism for mathematics majors. Therefore, future research should start from a broader perspective and adopt empirical methods to make this research more comprehensive, systematic and in-depth.

Keywords: *Mathematics, Graduate, Employment, Strategy, Literature, Students.*

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Highlights of this paper

- This research uses the literature analysis method to discuss the research on the employment situation of college graduates majoring in mathematics in the past in China.

1. INTRODUCTION

Mathematics, as a highly basic science major, is less popular in the social job market than many skill-based majors. Besides, the employment concepts of students and employers are generally biased to varying degrees. Various reasons have led to the severe employment situation of mathematics majors. In the context of the current era of big data and information technology, mathematical discipline knowledge and mathematical professionals have an irreplaceable role in all areas of society. Therefore, research on the employment situation of mathematics majors not only helps to alleviate the employment pressure in the talent market but also protects the self-interest of students and their families. In the past few years, researchers have conducted a variety of researches on the employment of college mathematics students. This paper intends to summarize and reflect on the research on the employment situation of college mathematics majors, summarize the current research results and provide directions for further research in the future.

2. METHONDS

2.1. Source of Data

All the documents and materials involved in this article are from China Knowledge Network (CNKI) database. CNKI is a large-scale full-text database that covers and integrates and disseminates various types of documents such as journals, doctoral theses, conference proceedings, newspapers, patents, and yearbooks in China on a large scale. It is also the most authoritative literature search tool for national academic journals. The tool contains the complete content of all Chinese journals, including various subject areas. Therefore, based on the completeness of its literature collection and its huge academic influence in China, this paper chooses this database to ensure the persuasiveness and reliability of the research.

2.2. Data Collection

To avoid missing literature as much as possible, the author first used "mathematics professional employment" and "theme" as the search terms. According to the ascending order of publication time, 77 results were retrieved and the publication time range was from 2009 to 2020. The author also used "math employment" and "theme" as the search terms and retrieved a total of 181 results in ascending order of publication time. After a comprehensive review, it was found that this research started late. The earliest research specifically targeted at the employment of mathematics major students was the article "Analysis and Countermeasures of Employment Situation of Normal Mathematics Students" published by Jin Guitang in 2008. At the same time, not all the documents consulted are consistent with the research question. Therefore, the author considers the cited quantity while considering the research question and only selects the literature with mathematics students as the research object and the employment status as research data and finally selected 34 references.

2.3. Data Collation

Due to the late start of this kind of research, there is not much literature available for reference. The author adopts the method of note-taking to read the literature intensively and organize the previous research results. In the process of reading the literature, the author summarized the research methods, research questions, research results and conclusions in each literature. After reviewing and collating all the literature and reading the notes, the

author preliminarily believes that the current research mainly focuses on the employment status of mathematical major students, the factors affecting the employment of mathematical major students, and suggestions to improve the employment status of mathematical major students.

3. RESULTS

3.1. Employment Status of Mathematics Students

In terms of graduation destinations and career choices for the mathematics major students, Zhang Chaoyuan and others investigated the employment concepts of graduates of the school of mathematics and applied mathematics of Dali University and found that the teaching career of the school is still the main form of career choice for the students. The proportion of students who have chosen the postgraduate and village official careers has also increased (Zhang, Yang, Zhang, & Wang, 2010). Fan Zhixin researched undergraduates majoring in mathematics at Huazhong University of Science and Technology. They found that more than one-third of the students chose direct employment, and some students were abroad, studying and waiting for employment. They believe that based on the current big data background, students' choice of employment industry has expanded to a certain extent. They have set foot in the Internet, electronics, finance, communications, education, and other industries, and have begun to present a diversified trend (Fan & Wang, 2017). Kong Huan believe that mathematics majors are facing a severe employment situation and great employment pressure. The traditional employment model is still the choice of most students, but based on the demand for talents in the social market, the number of students who choose to work in the Internet, e-commerce and other industries show an upward trend and some students work in enterprises, institutions and management departments (Kong & Li, 2016). The common point of view of Liu Jia, Li Shangfang, etc. is that the employment direction of graduates of mathematics majors is too single. Also, the research of Liu Jia believes that high employment expectations, poor job adaptability, poor professional skills and lack of career planning are also important problems in the employment of graduates of mathematics (Li & Pang, 2013; Liu & Xiang, 2018). Chen Zhangyang's research shows that the vast majority of graduates of mathematics and applied mathematics choose the teaching profession, while a small number of students continue to enter the postgraduate entrance examination; in addition to the postgraduate entrance examination, some students are engaged in work that has nothing to do with the major, resulting in knowledge to a certain extent waste of resources and low employee satisfaction for students (Chen, 2014).

Wang Yan explained the employment misunderstandings of mathematics graduates. From a student's perspective, she believes that students have insufficient entrepreneurial enthusiasm and are too conservative in their career choices. From a social perspective, the geographical distribution of posts, the narrow space for employment choices given to mathematics students by society, and the difficulty of cross-professional employment and entrepreneurship are the main reasons that cause the employment situation of mathematics graduates is not optimistic (Wang, 2013). Zhang Fengmin believe that major graduates of mathematics majoring in universities of science and technology mainly has three goals: continuing education, employment of related mathematics majors, and employment of non-mathematical majors (Zhang & Ma, 2013). Mao Qunying took students in mathematics education as the research object and thought that the students' professional views were incorrect, their basic skills were not solid, utilitarianism was strong, and their professional qualities and comprehensive qualities were slightly insufficient. These reasons led to their generally low employment competitiveness (Mao, 2010). Gao Ping believes that there are two main employment paths for fresh graduates in mathematics education in the education field: the government education department and the school education department (Gao, 2013). Fan Lili believe that the current employment situation of undergraduates in mathematics (Hebei Province) is not ideal and the employment

direction of information and computing science among all majors is relatively broad (Fan & Hao, 2018). Jiang, Zhang, and Zhao (2019) believe that there are three difficulties in re-employment of undergraduates majoring in mathematics: one is that there are few posts but the number of applicants is large; the second is that employers set limits on the level of graduate schools; the third is that there are dilemmas in which graduates cannot find jobs and employers cannot recruit talents (Jiang et al., 2019). Liu Jia targeted students of mathematics and applied mathematics. They believed that under the current environment of fierce employment competition, employers and graduates have different perceptions of positions and education departments as well as institutions have a certain degree of exclusion and prejudice to the majors of mathematics and applied mathematics (Liu & Xiang, 2019). Wu Xuan believes that the enlarging enrollment of mathematics students by universities in recent years has resulted in high employment pressure for students, inconsistent post-work and majors, difficult advantages to exert, and deviations in student employment mentality as well as insufficient motivation for employment (Wu, 2019).

In terms of students' choice of employment cities, research by Zhang Chaoyuan and others shows that the vast majority of Dali graduates' choice of employment cities is concentrated in the western region, especially Yunnan Province (Zhang et al., 2010). Mao Qunying clarified the career choice in graduates of mathematics education. The first is that students have strong regional awareness in the employment process. Students tend to work in cities. Few students lacking social responsibility and dedication go to the grassroots or remote areas (Mao, 2010). Gao Ping mentioned the factors affecting the employment choice of graduates of mathematics education majors, such as the location of the individual's household registration and their residence, which are also related to the career choice of the students in employment (Gao, 2013).

3.2. Factors Affecting Employment of Mathematics Students

Li Shiyu discussed the impact of undergraduate internships on postgraduate entrance examination and employment with students from a mathematical college in a university in Liaoning Province, the results show that the undergraduate internship has led to a decline in the employment rate of students, but the gap between the employment rate and the high-quality employment rate is constantly narrowing, students are paying more and more attention to the quality of jobs, and employment expectations are increasing (Li, 2019). Wu Min distributed questionnaires to mathematics graduates from a normal university. The results showed that gender has significant differences in the view that "as long as it can make a lot of money, it doesn't matter which occupation you choose," that is, professional maturity affects students' career choice (Wu & Pu, 2019). Li Shangfang expounded that there are three main reasons for the difficulty of employment for mathematics students: one is the lagging of students' employment choices; the second is the increase in employment thresholds and the increase in the number of competitors; the last is the huge competitive pressure caused by the imbalance between supply and demand in the talent market and social needs (Li & Pang, 2013).

Chen Zhangyang believes that the factors affecting the employment satisfaction of students majoring in mathematics and applied mathematics are as follows: from the perspective of the students themselves, the students' quality is poor, their practical experience is insufficient and their employment mentality is not good; From the perspective of the school, the school lacks corresponding employment guidance courses in the curriculum setting so that students do not have detailed plans and goals when facing employment (Chen, 2014). Guo Jianxia studied the employment situation of mathematics students in Henan Province. They believe that the reasons for the difficulty of employment for mathematics teachers majors are as follows: From the perspective of college cultivation, the employment information channels provided by the school are not smooth, and student training excessive scale and the participation of non-teacher students have put some pressure on student employment; From a social perspective,

the increase in the employer's employment specifications and the constraints of local finances and the employment system cannot provide a strong guarantee for the employment of students, resulting in difficulties in employment for students (Guo, Zhao, & Wang, 2010). Cao Wanrong and others carried out research on the employment problems of non-normal students and believed that the off-campus practice base was mainly for completing teaching tasks, which did not benefit students' practice; From an employment perspective, the reasons for the lack of optimism in the employment situation of non-teacher mathematics students are that the channels for obtaining employment information are not smooth, the employment information is not well grasped, the employment regulations of colleges and universities are not perfect, and colleges and students have not paid enough attention to academic planning (Cao, Zhu, Wang, & Liu, 2014).

Gao Ping believes that the employment choices of fresh college students majoring in mathematics education are mainly affected by 10 factors, including social development needs, personal domicile location, residence, industry information and prospects, personal income satisfaction, and tolerance of their challenges (Gao, 2013). In Jin Guitang's analysis of the employment situation of mathematics normal students, we can also extract the reasons for the optimism of the employment situation, including the fact that the professional setting and training mode of colleges and universities are not suitable for the needs of social and economic development, the imbalance between supply and demand as well as between different levels of education and regions.

The current personnel management system is unreasonable, a large number of non-teacher students enter for job competition, and students' backward employment concepts and high expectations also result in low student employment competitiveness (Jin, 2008). Yang Yunfan explained the reasons for the low employment competitiveness of mathematics major students, mainly because the students' practical application ability, willpower and self-regulation ability, teamwork consciousness and cooperation spirit were relatively lacking (Yang & Wei, 2015). Zhao Shuyue believe that the employment factors affecting graduates of mathematics majors include insufficient professional knowledge of students, problems in admissions and employment policies, and deviations in employment concepts (Zhao & Li, 2017).

From the perspective of the core literacy of student development, Liu Jia believe that the factors affecting the employment difficulties of students majoring in mathematics and applied mathematics are mainly the single training model of colleges and universities, relatively backward employment policies, unclear employment concepts and talent training goals, social development needs and self-deviations between positioning (Liu & Xiang, 2019). Zhao Wenlu believes that there are four main reasons for the difficulty in obtaining employment for mathematics teachers majors: first, the lack of professional knowledge of the students, and their basic skills are not solid.

Secondly, the employment direction is too singular and is confined to the profession of teachers, and the entry of non-teacher students makes the competition pressure of mathematics teachers very strong. Thirdly, in terms of curriculum setting, there are fewer interdisciplinary courses such as finance and IT, which make it difficult to meet social needs. Finally, the school's teaching model does not incorporate talent needs (Zhao, 2018). Guo Xiaochuan used student cadres of the school of mathematical sciences of Beijing Normal University as the research object and conducted a questionnaire survey. The results showed that students generally valued the professional knowledge and general vocational skills in employability, and did not pay enough attention to a personal character (Guo & Wei, 2018) Zhong Liyan believes that there are three main reasons for the lack of employment competitiveness of teachers of mathematics majors: first, the lack of professional planning of students; the lack of professional knowledge of students; and third, the poor practical ability of students (Zhong, 2017).

3.3. Suggestions for Improving the Employment Situation of Mathematics Students

After investigating information about students' career ideals, values, and employment issues, Zhang Chaoyuan and others made the following suggestions for students' various employment issues: conduct more employment lectures to increase publicity, expand employment channels, and enrich student practice experience as well as employment skills and basic skills training in the form of assessment and mentor training (Zhang et al., 2010). Fan Zhixin put forward two suggestions for the employment reform of colleges and universities: first, make full use of the role of college employment guidance centers. The second is to carry out curriculum reforms aimed at improving professional core knowledge grasping ability and combining with social needs (Fan & Wang, 2017). Kong Huan put forward four suggestions after conducting a SWOT analysis on the employment of mathematics majors: firstly, clarify the training objectives, with the main purpose of improving students' innovative ability and big data analysis and processing ability; secondly, innovative talent training mode and curriculum; the third is to use the form of school-enterprise cooperation to build an open and shared platform; the fourth is to strengthen the cultivation of students' innovative practical ability (Kong & Li, 2016). Wu Min believe that professional maturity affects the employment choice of mathematics majors. Therefore, colleges and universities should work harder to change the student's employment concept, strengthen students' career guidance and employment concept guidance, conduct lectures on professional psychology, and let students look at employment from a development perspective (Wu & Pu, 2019).

Liu Min took mathematics and applied mathematics students as the research object and concluded that improving the employability of normal students should be reformed from the government, society, schools, and graduates themselves: the government should optimize the employment environment of graduates and ensure the full employment of students; all sectors of society should also increase their support for graduates; schools should improve the talent training model and innovate teaching methods; graduates themselves should change their employment concepts and strengthen their initiative (Liu, 2019). Liu Jia explored the employment prospects of normal and graduate students in mathematics and applied mathematics. Based on the narrow space of career choices, he believed that graduates should expand the scope of career choices and employment cities. Training institutions, finance, IT, and self-employment should be widely accepted. In terms of geographical choice, we can take the initiative to serve in areas where basic education is backward, and reflect our sense of social responsibility and dedication. In the final analysis, students are required to change their employment concepts (Liu, 2017).

Besides, Liu Jia mentioned in another article the society's ability requirements for mathematics majors, mainly including basic mathematical literacy, solid professional knowledge and skills, basic word processing and computer application capabilities, interpersonal relationship processing capabilities, and problem handling. These requirements can also guide graduates to continuously improve their employment situation (Liu & Xiang, 2018). Li Shangfang believe that students' employment competitiveness can be strengthened by measures such as changing students' employment choice concepts, cultivating students' entrepreneurial ability, and strengthening graduate employment guidance (Li & Pang, 2013). From the perspective of self-evaluation, Guo Xiaochuan put forward requirements for students to improve their employability, including improving personal quality, consolidating professional knowledge and improving general skills (Guo & Wei, 2018). Chen Zhangyang believes that the employment competitiveness of students should be improved from the aspects of cultivating students' pragmatic personal spirit, actively participating in social practice, strengthening the provision of employment guidance courses, and cultivating students' comprehensive qualities through multiple channels (Chen, 2014). Wang Yan believes that the ways to solve the misunderstanding of graduates of mathematics majors start from three aspects: to innovate in the employment education model and encourage students to find employment at the grassroots level;

specialized employment guidance to help students make career plans and train students in a targeted manner based on the composition of employability; to reform the allocation of mathematics courses in conjunction with employment needs, such as retaining a normal size of normal student teaching, offering hot employment courses, cross-disciplinary, and applied professional courses to expand employment (Wang, 2013). Wang Fang believes that it is not possible to emphasize curriculum reform alone. At the same time of reform, we must pay attention to adapting to market needs, understand the differences between the training system and the job market, and train students more efficiently (Wang, 2012). Liu Guangfu believe that colleges and universities should strengthen employment guidance, and students should expand their employment options and make career plans by social dynamics (Liu, & Li, 2017). Cao Wanrong and others made suggestions on the employment of non-normal math students from three aspects: school, individual and society. In terms of personal ability development, students should make early academic plans, have clear goals, maintain an optimistic and good attitude, and improve their professional skills and knowledge; in terms of school training, first of all, we should clarify the direction of professional training, adjust the curriculum structure, use the form of school-enterprise cooperation to increase practical teaching links to enrich students' practical experience, and we should also pay attention to the construction of employment information platforms and the work efficiency of employment guidance groups; at the social level, the society and employers should treat the popularization of higher education correctly, not exclude and encourage guidance (Cao et al., 2014).

Guo Jianxia and others proposed reform strategies from universities, governments, and employers. For example, the government has increased publicity, improved the employment system, and financial and policy support; universities have increased practical teaching and employment guidance and conducted curriculum reforms to enhance students' adaptive ability; strengthen the construction of employment information network, forge a high-quality employment team, increase investment to broaden the employment channels of students and effectively create favorable conditions for university students' employment (Guo. et al., 2010). Xu Hongwei believes that colleges and universities should clarify the training goals of mathematics professionals, reform the teaching curriculum system, teaching methods and methods, guide students' learning interests, improve students' practical ability and professional knowledge and other measures to improve the employment competitiveness of applied mathematics students (Xu, 2019). From the perspective of employment, Wang Haiyan puts forward suggestions on mathematics and applied mathematics teaching and believes that teaching should be reformed by strengthening the specialty of teaching content, updating teaching methods, and strengthening students' employability training (Wang, 2016). Zhou Qingye conducted research on teaching reform aimed at improving the employment rate of students majoring in mathematics. He believed that the teaching practice should be strengthened, the teaching content should be reformed, the professionalism and cutting-edge of teaching content should be enhanced, and innovative teaching models in various aspects (Zhou, 2019).

Zhang Fengmin refined many suggestions for improving the employment status of mathematics majors from the aspects of the training model: First, the talent training goals are consistent with the actual needs of the talent market, reflecting the characteristics of universities and adjusting the curriculum system; training subjects, such as on-campus simulation laboratories and off-campus practical training internships; thirdly, strengthening employment guidance work systems, such as corporate training, professional literacy training, and professional campus culture construction (Zhang & Ma, 2013). From the perspective of employment, Li Jinna proposed a teaching reform plan for mathematics majors, including five aspects: clarification of professional positioning and career choices, construction of teachers, reform of curriculum settings, construction of teaching materials, and construction of practical teaching bases (Li & Xie, 2009). Zhong Liyan believes that mathematics majors should be

trained by type, but no matter what majors they have, they must have a solid foundation in mathematics and practical skills. At the same time, schools should provide more professional elective courses to provide students with more choices. Also, in terms of enhancing students' practical ability, the researchers proposed different training suggestions for the three groups of educators, non-educators and postgraduate students (Zhong, 2017). Mao Qunying proposed four ways to improve the employability of students: one is to achieve the perfect connection between talent training goals and social needs; the second is to strengthen the employment guidance for students; the third is to guide students to establish a scientific employment concept; the fourth is to strengthen training to improve students' comprehensive skills (Mao, 2010). Fan Lili put forward four teaching suggestions, mainly including modular talent training, in-depth teaching reform of professional courses, practical specialty training, and college students' entrepreneurship guidance (Fan & Hao, 2018). Jin Guitang believes that in measures to improve the employment competitiveness of mathematics teachers, first of all, we should pay attention to advancing with the times in the concept of college students' employment work; and secondly, we must train students' pragmatic spirit and practical ability; finally, the full membership and specialization of employment management services are important (Jin, 2008). Han Yamei investigated the employability structure and current situation of college students majoring in mathematics and applied mathematics and believed that the combination of ideological and political education and employment education should be adopted first, followed by mental health education and the cultivation of solidarity and cooperation. Finally, he mentioned that a complete course structure (Han, 2018). Yang Yunfan believe that the mathematical modeling competition can well train students' creative ability and thus improve their employability (Yang & Wei, 2015).

Zhang Jingchen believe that students should pay attention to improving their overall quality; schools should improve the mathematical professional employment guidance model, design professional courses by the training goals, and improve the employment competitiveness of mathematical students through these channels (Zhang.. & Wang, 2015). Zhao Shuyue believe that changes in the employers' concept of employment, adjustments, and changes in the concept of students' employment and entrepreneurship, and their efforts, as well as the improvement of relevant employment systems of government departments, can improve the employment of mathematics students (Zhao & Li, 2017). Jiang Shuzhen and others believe that accurately positioning talent training goals, comprehensively strengthening employment guidance, actively carrying out teaching reforms, and implementing school-enterprise cooperative training methods are conducive to alleviating the stressful employment situation of mathematics students (Jiang et al., 2019). Liu Jia summarized the measures to improve the employment competitiveness of mathematics majors as a core talent-oriented and employment-oriented talent training model adjustment, such as training talents who can adapt to social and economic development, improving students' mathematical literacy and constructing a talent training system centered on moral cultivation (Liu & Xiang, 2019). Xu Hongwei believes that it is necessary to train students by major, optimize the training mode, and improve the employability of mathematics students through conferences and "3 + 1" comprehensive quality training (Xu, 2019).

4. DISCUSSION

In general, the current domestic research on the employment situation of college mathematics majors focuses on three aspects: the current employment situation of students, influencing factors of employment, and strategies and suggestions for improving the employment situation. Regarding the employment status of students majoring in mathematics, the predecessors believed that students choose more teachers' occupations in employment, and mostly work in economically developed areas or where their household registration (residence) is located. With the development of the times, the proportion of graduates of mathematics majors in finance, internet, computer, and other fields has increased, indicating that the employment and career perspectives of mathematics majors have

begun to change, but there is still much room for improvement. Regarding the employment influencing factors, the predecessors believe that it mainly comes from the three major aspects of students themselves, universities and society. And from previous research, we can see that the reform of the training of mathematics students in colleges and universities is a very urgent and important factor. At the same time, there are many social reasons such as the competition of non-mathematics teachers, employment policy and personnel management system disadvantages, and social development needs. Mathematics students have many disadvantages in fierce employment competition (Xu, 2019). For measures to improve the employment situation of mathematics major students, previous researchers mainly studied the strategies that can alleviate the severe employment situation of the mathematics major students from three aspects: teaching reform in colleges and universities, student improvement, and support from social and government departments. Many researchers have put forward relevant suggestions from the perspective of improving students' quality, including improving their professional quality, professional knowledge, comprehensive quality, and innovation ability. It is also necessary to establish a scientific employment concept. Researchers' suggestions to colleges and universities focus on teaching reform, including the professionalization and integration of teaching content, the addition of practical teaching links, innovative teaching models and methods, clear training goals for talents that meet the needs of social development, and efforts to improve the efficiency of the employment guidance department.

It can be seen from the above that the previous research has been very extensive and some researches have been in-depth, but there are still some shortcomings, such as the research methods applied by previous people. Most of the previous studies are based on previous theoretical studies, and only a small number of them use quantitative research methods such as questionnaire surveys and data analysis, which have greatly weakened the persuasiveness of the research. Another example is studying the measures proposed. In previous studies, many people proposed measures aimed at social policies, government support, and employers. This wrong measure is very broad and should not be implemented directly. For example, employers should change the traditional concept of employment, not to exclude or discriminate against students majoring in mathematics, etc. These measures are very meticulous and specific, and it is difficult to implement them. Therefore, based on existing research, it is necessary to improve research methods, adopt more scientific methods, and further discuss the employment problem of college students of mathematics from the perspective of implementation.

Not only is that but from the above studies, there some blank spots in previous studies. For example, there are few types of research on the development of mathematics ability and innovation ability of mathematics students based on an employment perspective. Most of the current research is aimed at graduates of mathematics and applied mathematics and mathematics education, and there are few studies on employment issues of graduates of other mathematics majors. Therefore, it is necessary to expand the scope of future research again to make this research more systematic and comprehensive.

5. CONCLUSIONS

It is of great value to review and summarize the research on the employment situation of college mathematics students. This research, through reviewing, combing, and analyzing the above-mentioned studies over the past 10 years, found that:

(1) In recent years, research on the employment situation of mathematics major students has focused on three aspects: the employment status of the mathematics major students, the factors affecting the employment of mathematics major students, and the cultivation strategies to improve the employment status of mathematical

major students. For these three aspects, the predecessors not only made in-depth research but also obtained many results.

(2) Reviewing the previous research, we can find that there are obvious deficiencies in some places. Such as research methods. In the past, most researches have adopted the method of theoretical speculation, and few empirical methods have been studied, which has greatly reduced the credibility of the research results. Another example is the measures proposed by previous research. In previous research, the measures proposed by many people were very broad and should not be implemented directly.

(3) There are also some blank spots in previous research. For example, there are few types of research on the development of mathematical ability and innovation ability of mathematics students based on the employment perspective; almost no research on how to establish an employment ability evaluation mechanism for mathematics majors; few types of research on the employment issues of graduates of all mathematics majors, etc.

Therefore, future research must improve the research method based on the existing research, adopt more scientific methods, and further explore the employment problem of college students of mathematics from the perspective of implementation. It is necessary to study the employment of graduates of mathematics from a broader perspective to make this research more comprehensive, systematic and in-depth.

REFERENCES

- Cao, W. R., Zhu, R. P., Wang, W. L., & Liu, C. (2014). Research on several issues of enhancing the employment competitiveness of non-normal mathematics majors. *Education and Teaching Forum*, 6(31), 2-4.
- Chen, Z. Y. (2014). Analysis and research on the employment situation of college mathematics and applied mathematics. *Intelligence*, 14(8), 196.
- Fan, Z. X., & Wang, P. (2017). Analysis of graduate employment status based on archive data under the background of big data: A case study of undergraduates from the School of Mathematics and Statistics of Huazhong University of Science and Technology. *Lantai World*, 32(20), 34-37.
- Fan, L. L., & Hao, P. Y. (2018). Research on the cultivation of employment and entrepreneurial ability of Mathematics undergraduates——taking tangshan teachers college as an example. *Journal of Tangshan Teachers College*, 40(3), 127-129.
- Gao, P. (2013). Analysis of employment path of new college students of Mathematics education. *Journal of Changchun Teachers College*, 32(8), 137-139.
- Guo, J. X., Zhao, G. X., & Wang, S. Y. (2010). Employment situation and countermeasures of undergraduate mathematics students in Henan Normal University. *Contemporary Education Forum (Management Edition)*, 9(3), 90-91.
- Guo, X. C., & Wei, W. (2018). A probe into the employment capability of student cadres in colleges and universities of science——Taking the school of mathematical sciences of Beijing Normal University as an example. *Science Teaching Journal (Early Issue)*, 10(4), 170-173.
- Han, Y. M. (2018). Investigation and research on the employment capability structure and status of college students majoring in mathematics and applied mathematics. *Chinese and Foreign Entrepreneurs*, 35(13), 173-174.
- Jiang, S. Z., Zhang, S., & Zhao, Y. J. (2019). A practical exploration of improving the employability of undergraduates in Mathematics——take the school of humanities of Northeast normal University as an example. *Human Resources Development*, 27(18), 41-42.
- Jin, G. T. (2008). An analysis of the employment situation of normal college students and countermeasures. *Journal of Liaoning College of Education and Administration*, 26(3), 135-136.

- Kong, H., & Li, X. (2016). Analysis and cultivation of employment prospects for mathematics majors in the data age. *Journal of Shandong Youth Politics College, 32(3)*, 54-57.
- Li, S. F., & Pang, W. (2013). Investigation on the employment situation of mathematics graduates in local teachers colleges——Taking Yulin Normal College as an example. *Electronic Production, 20(7)*, 256.
- Li, S. Y. (2019). The impact of undergraduate internship on the postgraduate entrance examination and employment——Taking a student of mathematics college of a university in Liaoning Province as an example. *Science & Technology Economics, 27(18)*, 132-133.
- Li, J. N., & Xie, Y. H. (2009). Research on employment-oriented college mathematics construction. *Consumer Guide, 60(22)*, 160-163.
- Liu, J., & Xiang, S. S. (2018). An analysis of the employment status of mathematics and applied mathematics (normal) in local colleges. *New Curriculum Research, 15(3)*, 87-88.
- Liu, J., & Xiang, S. S. (2019). Research on employment-oriented talent cultivation of mathematics and applied mathematics in local colleges and universities. *Zhengzhou Teacher Education, 8(2)*, 61-64.
- Liu., M. (2019). A study of improving the employment ability of normal college students in local universities——Taking mathematics and applied mathematics as examples of new curriculum research. *Industry and Technology Forum, 18(11)*, 281-282.
- Liu, J. (2017). Discussion on the prospects of professional employment in local mathematics and applied mathematics (normal). *Neijiang Technology, 38(9)*, 62-15.
- Liu, G. F., & Li, C. F. (2017). Analysis of employment prospects of mathematics and applied mathematics. *Western Leather, 39(10)*, 196.
- Mao, Q. Y. (2010). Path selection of employment ability of Mathematics education graduates. *Management Journal, 23(3)*, 90-92.
- Wang, Y. (2013). Misunderstandings and solutions of graduates majoring in mathematics in colleges and universities. *Employment of Chinese College Students, 15(10)*, 41-45.
- Wang, F. (2012). Analysis of the employment situation of college mathematics students. *Business Herald, 13(13)*, 250.
- Wang, H. Y. (2016). Research on employment-oriented teaching of college mathematics and applied mathematics. *Inner Mongolia Education (Vocational Education Edition), 6(6)*, 92.
- Wu, X. (2019). Employment status and improvement path of applied Mathematics. *Journal of Jiamusi Vocational College, 36(11)*, 149-152.
- Wu, M., & Pu, H. (2019). The impact of college students' professional maturity on employment——taking the school of mathematical sciences of Xingyi university for nationalities as an example. *Journal of Xingyi Teachers College for Nationalities, 33(4)*, 53-55.
- Xu, H. W. (2019). An analysis of employment-oriented teaching reform in mathematics and applied mathematics. *Curriculum Education Research, 8(13)*, 121.
- Yang, Y. F., & Wei, J. Y. (2015). Research on the strategy of improving the employment competitiveness of mathematics students. *Journal of Contemporary Teaching and Research, 3(8)*, 42.
- Zhang, C. Y., Yang, D. Z., Zhang, Q., & Wang, P. D. (2010). Analysis and research on the employment situation of Mathematics and applied mathematics in Dali University. *Journal of Dali University, 9(4)*, 90-93.
- Zhang, F. M., & Ma, Z. L. (2013). Analysis of the employment of Mathematics graduates in universities of science and engineering. *Education and Career, 97(14)*, 95-97.
- Zhang, J. C., & Wang, L. Z. (2015). An analysis of the professional competitiveness of mathematics students. *Curriculum Education Research, 4(33)*, 246-247.

- Zhao, S. Y., & Li, C. F. (2017). Talking about employment problems and countermeasures of graduates of mathematics college. *Western Leather, 39*(10), 262.
- Zhao, W. L. (2018). Using mathematical modeling competition as a platform to improve the employment competitiveness of students of math teachers. *Math Learning and Research, 36*(17), 17.
- Zhong, L. Y. (2017). How to improve the employment competitiveness of normal college students majoring in mathematics. *Education Watch (First Half Month), 6*(1), 63-65.
- Zhou, Q. Y. (2019). Research on mathematics and application of professional mathematics teaching in colleges and universities guided by employment. *Think Tank Era, 3*(7), 63-65.

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