

Research on the Status Quo of Mathematics Learning Interests of Graduate Students in Mathematics

Miaomiao Zhang, Zezhong Yang*

The School of Mathematics and Statistics, Shandong Normal University, Jinan, China

Abstract

Interest in mathematics learning has important guiding and driving functions for mathematics learning, and it is an important factor affecting the scientific research ability of mathematics postgraduates. This study takes 55 graduate students majoring in mathematics from the School of Mathematics and Statistics of Shandong Normal University as participants and explores the mathematics learning interest of graduate students majoring in mathematics by means of a questionnaire survey. The questionnaire is divided into three dimensions, namely professional mathematics learning in class, professional mathematics learning after class, and amateur mathematics learning after class. Survey results indicate that the graduate students of mathematics major have certain enthusiasm in the professional mathematics learning in class, professional mathematics learning after class, and amateur mathematics learning after class, but the degree is not high. So we can draw a conclusion that the graduate students of mathematics major have an interest in mathematics learning, however, the degree of interest in mathematics learning is at the general level. Based on this conclusion, teachers should improve students' enthusiasm and initiative in mathematics learning, focus on cultivating students' interest in mathematics learning, so that graduate students majoring in mathematics can become more actively involved in mathematical research activities.

Keywords

Interest, Mathematics Learning, Graduate Students

Received: January 8, 2020 / Accepted: February 13, 2020 / Published online: March 24, 2020

© 2019 The Authors. Published by American Institute of Science. This Open Access article is under the CC BY license.

<http://creativecommons.org/licenses/by/4.0/>

1. Introduction

Mathematics, as a component of science, provides language, logic, and calculation tools to other branches of science, which is an important force to promote scientific and technological progress, and the mathematical research team and its scientific research ability are important factors affecting the development of mathematics. At present, graduate students majoring in mathematics have become an important force in the scientific research team, research ability of graduate students is closely related to their interest in mathematical learning [1-2]. In addition, interest in mathematics learning has important guiding and driving functions for mathematics learning [3]. Therefore, it is of great significance to investigate

the current situation of mathematics learning interest of graduate students in mathematics.

2. Research Review

Regarding graduate students in mathematics, Houyu Zhao proposes to introduce the teaching mode of flipping classroom into the teaching of basic courses for graduate students of mathematics [4]; Juan Wang proposes the use of a bisective classroom teaching model in the teaching of graduate courses for mathematics majors, which is divided into three steps: lecture, internalization, and discussion [5]; Qihuai Liu and Leilei Jia propose to cultivate the innovation ability of mathematics graduate students from four aspects, namely

* Corresponding author

E-mail address: zhongzee@163.com (Zezhong Yang)

encouraging and supporting graduate students to publish academic papers, focusing on the cultivation of graduate students' ideology and morality, focusing on the efficiency of discussion classes, and establishing stronger graduate management and supervision system [6]; Heyuan Wang put forward a new model of innovative ability training for graduate students in mathematics, namely the "trinity" innovative talent training mode of curriculum study, thesis link, and innovative activities [7].

Regarding postgraduate mathematics learning, Through BP network model, Shaohong Du, Wenshuo Li and others screen out that interest, tutoring relationship, industry assistance, topic difficulty, degree of innovation, teacher level, supervision factors, evaluation system, learning atmosphere have significant relationship with mathematics learning ability, and accordingly put forward suggestions for mathematics learning of graduate students of different majors [8].

Reviewing the previous researches, it is found that there are researches on the teaching model of graduate students in mathematics, the cultivation of innovative ability of graduate students in mathematics, and mathematics learning for all graduate students, however, no scholars have studied the mathematics learning interest of mathematics postgraduates. And mathematics learning interest is particularly important for mathematics graduate students, therefore, this study intends to use empirical methods to investigate the current situation of mathematics learning interest of mathematics graduate students.

3. Theoretical Basis

In the definition of psychology, interest, as a kind of non intelligence factor, which is based on people's need to know and explore something or engage in an activity, is a psychological tendency that actively explores such things or engages in such activities [9]. When people become interested in something, they always show great enthusiasm, explore things with joy, excitement and emotion, and devote themselves to the understanding of things [10-11].

Learning interest as a kind of interest, different scholars have different understandings about its meaning. Hongyu Li and Yisu He believe that learning interest is a cognitive tendency and the most active factor in students' learning activities [12]; Weihua Zhao believes that learning interest refers to a person's positive cognitive tendency of learning and emotional state [13]; Mingyuan Gu proposes in the Education Dictionary: The student's interest in learning is the internal motivation to promote learning activities. From the above scholars' point of view, we can see that learning interest is a positive cognitive tendency, accompanied by emotional experience, and is the internal motivation of

students' learning.

Regarding mathematics learning interest, According to Hui Huang and Hongwei Peng, interest in mathematics learning refers to students' interest in learning mathematics knowledge and their desire for mathematics knowledge and development of mathematics ability [14-15]. That is, mathematics learning interest is a kind of learning interest, and all the characteristics of the learning interest explored above are also applicable to mathematics learning interest. Therefore, in this study, mathematics learning interest is defined as: "mathematics learning interest is a kind of psychological tendency that learners strive to explore mathematics knowledge and form mathematics ability, accompanied by strong emotional experience, so that mathematics learning becomes active and active." This research will use this definition as the basis for compiling a questionnaire, by investigating the enthusiasm of mathematics graduate students for mathematics learning, and study the current situation of mathematics graduate students' interest in mathematics learning.

4. Research Methods

4.1. Research Object

55 graduate students from the School of Mathematics and Statistics of Shandong Normal University are selected as the research objects. They include 13 people in Basic Mathematics, 11 people in Applied Statistics, 11 people in Computational Mathematics, 10 people in Applied Mathematics, 5 people in Operations Research and Cybernetics and 5 people in Statistics.

4.2. Research Instrument

This research adopts the method of questionnaire, with the help of "questionnaire star" to investigate the mathematics learning interest of mathematics major graduate students.

1. Questionnaire evaluation indicators

The questionnaire is divided into three dimensions, namely professional mathematics learning in class, professional mathematics learning after class, and amateur mathematics learning after class. The professional mathematics learning in class includes four evaluation indicators: actively answering questions, actively asking questions, taking notes, and actively discussing in mathematics classes. The professional mathematics learning after class includes five evaluation indicators: reflecting on the learning situation of mathematics, making learning plans, previewing, communicating after class, and doing mathematical puzzles. The amateur mathematics learning after class includes ten evaluation indicators: exploring the principles of mathematical formulas, connecting mathematics with practice, trying new learning methods,

participating in mathematical competitions, talking about mathematical knowledge, learning mathematicians, liking mathematics history, paying attention to the frontiers of mathematics, reading mathematics magazines, and watching math videos.

2. Questionnaire structure

This questionnaire consists of two parts. The first part is the personal information of the students which includes the major and gender, and the second part is the main part of the questionnaire. Through the form of single choice questions, collect the students' evaluation results on the professional mathematics learning in class, the professional mathematics learning after class and the amateur mathematics learning after class. Take the 5-point scoring method in the scale, "totally conformity" is "5 points", "conformity" is "4 points", "general" is "3 points", "inconformity" is "2 points", "strongly inconformity" is "1 point".

There are 21 questions in the questionnaire. Questions 2 to 6 belong to professional mathematics learning in class, questions 7 to 11 belong to professional mathematics learning after class, and questions 12 to 21 belong to amateur mathematics learning after class.

4.3. Information Collection

Table 1. Major Mathematics Study in Class.

	3. Positively answer questions	4. Ask questions	5. Take notes	6. Actively discuss
Total conformity	5.45%	3.64%	32.73%	18.18%
Conformity	27.27%	23.64%	36.36%	36.36%
General	52.73%	43.64%	23.64%	36.36%
Inconformity	10.91%	20.00%	5.45%	7.27%
Strongly inconformity	3.64%	9.09%	1.82%	1.82%
Overall average score	3.42			

5.2. Professional Mathematics Learning After Class

According to the statistical results, about 70% of the students choose the "general" and "conformity" options in the four topics of reflecting on mathematics learning, formulating study plans, previewing, and communication after class, which shows that most of the students have certain enthusiasm

In this study, the questionnaire contents will be entered into the "questionnaire star" to generate a questionnaire, and the survey is conducted with the help of the "questionnaire star".

4.4. Data Processing

Calculate the percentage and average of the questionnaire with the help of the "questionnaire star" data statistics function.

5. Results

5.1. Professional Mathematics Learning in Class

According to the statistical results, about 70% of the students choose the "general" and "conformity" options in the three questions of actively answering questions, asking questions, and discussing in class, which shows that most of the students have certain enthusiasm for this, but their enthusiasm is not high; In taking notes in class, 72% of the students choose the two options of "conformity" and "total conformity", indicating that most of the students are more active in taking notes. Secondly, the overall average score is 3.42, which shows that the students' enthusiasm for mathematics learning is at a general level. Details are shown in Table 1.

for this, but the enthusiasm is not high. In the problem of doing math puzzles, 76% of the students choose the "general" and "inconformity" options, indicating that most students are not active in doing math problems. Secondly, the overall average score is 3.42, indicating that the students' enthusiasm in mathematics learning is at a general level. Details are shown in Table 2.

Table 2. Specialized Mathematics Learning in Class.

	7 Reflection on math learning	8 Develop a study plan	9 Preview	10 Class communication	11 Do math puzzles
Total conformity	12.73%	9.09%	9.09%	20.00%	10.91%
Conformity	32.73%	29.09%	29.09%	27.27%	10.91%
General	50.91%	52.73%	40.00%	40.00%	49.09%
Inconformity	3.64%	9.09%	16.36%	9.09%	27.27%
Strongly inconformity	0%	0.00%	5.45%	3.64%	1.82%
Overall average score	3.33				

5.3. Amateur Mathematics Learning After Class

According to the statistical results, among the eight topics of exploring mathematical formulas, connecting mathematics to reality, trying new methods, participating in mathematical contests, learning mathematicians, liking the history of mathematics, paying attention to the frontiers, and watching mathematical videos, about 70% of the students chose “general” “conforming” two options, indicating that most

students have a certain enthusiasm for them, but the enthusiasm is not high. About 70% of the students choose the two options of “general” and “inconformity” in the two topics of talking about mathematics knowledge and reading mathematics magazines, which shows that most of the students are not active in the two regards. Secondly, the overall average score is 3.19, indicating that students’ enthusiasm in mathematics learning is at a general level. Details are shown in Table 3.

Table 3. Amateur Mathematics Learning After Class.

	Total conformity	Conformity	General	Inconformity	Strongly inconformity
12 Exploring mathematical formulas	7.27%	29.09%	43.64%	14.55%	5.45%
13 Mathematics with practice	9.09%	21.82%	47.27%	18.18%	3.64%
14 Try new methods	9.09%	25.45%	52.73%	9.09%	3.64%
15 Participate in mathematics contests	21.82%	21.82%	36.36%	14.55%	5.45%
16 Talk about mathematical knowledge	9.09%	7.27%	49.09%	27.27%	7.27%
17 Learning mathematicians	12.73%	23.64%	41.82%	18.18%	3.64%
18 Like history of mathematics	10.91%	32.73%	38.18%	10.91%	7.27%
19 Focus on mathematical frontiers	18.18%	21.82%	45.45%	10.91%	3.64%
20 Journal of mathematics	14.55%	14.55%	43.64%	21.82%	5.45%
21 Watch math videos	7.27%	16.30%	58.18%	12.73%	5.45%
Overall average score	3.19				

6. Discussion

(1) Professional Mathematics Learning in Class

From the above statistical results of the questionnaire, we can see that most of the students have a certain enthusiasm for answering questions, asking questions and discussing in class, but the enthusiasm is not high; most of the students have a high enthusiasm for taking notes. And the overall average score is 3.42, indicating that the overall enthusiasm is at a general level. Therefore, graduate students majoring in mathematics have interest in learning mathematics in class, but the degree of interest is general.

(2) Professional Mathematics Learning After Class

From the above statistical results of the questionnaire, we can see that most of the students have a certain enthusiasm for reflecting on mathematics learning, making learning plans, preview, and off-class communication, but it is not high; and most of students are not active in doing math puzzles. That is, the five items of professional mathematics learning after class, only one shows no enthusiasm, and the overall average score is 3.33, which indicates that overall enthusiasm is at a general level. Therefore, graduate students majoring in mathematics have interest in learning mathematics after class, but the degree of interest is general.

(3) Amateur Mathematics Learning After Class

From the above statistical results of the questionnaire, we can see that most of the students have some enthusiasm for exploring mathematical formulas, integrating mathematics

with practice, trying new methods, participating in mathematical competitions, learning mathematicians, and liking mathematical history, but their enthusiasm is not high; most of the students are not positive with talking about mathematical knowledge and reading maths magazines, that is, only two of the 10 items of amateur mathematics learning after class show no enthusiasm. And the overall average score is 3.19, indicating that the overall enthusiasm is at the general level. Therefore, graduate students majoring in mathematics have interest in learning mathematics after class, but the degree of interest is general.

On the whole, 15 of the 19 items show that most of the students have some enthusiasm, but the enthusiasm is not high, and the overall average score is 3.27, indicating that the enthusiasm of mathematics major postgraduates in mathematics learning is at a general level. From this we can know that the graduate students of mathematics are interested in mathematics learning, but the degree of interest is at the general level.

7. Conclusion

From the above analysis, we can draw the conclusion that current graduate students majoring in mathematics have interest in mathematics learning, however, its degree is at the general level.

The interest in mathematics learning affects the mathematics learning and research capabilities of mathematics postgraduates. Therefore, teachers should timely guide the graduate students of mathematics to appreciate the value of

mathematics, focus on cultivating students' interest in mathematics learning, improve students' enthusiasm and initiative in mathematics learning, so that graduate students in mathematics can become more actively involved in mathematical research activities.

In this survey, only 55 graduate students in mathematics from the School of Mathematics and Statistics of Shandong Normal University are selected as the research object, and the sample size was small. In the subsequent research, the research sample will be expanded to broaden the conclusions of the research.

Acknowledgements

This research was financially supported by the Shandong provincial education department (Grant NO. SDYY17127) and the Shandong normal university (Grant NO. 2016JG29).

References

- [1] Lin QW (2019) On the factors affecting the interest of junior middle school students in Mathematics Learning. *Mathematics Teaching Communication* 20: 39-40.
- [2] Ji JJ (2013) Influencing factors and Enlightenment of excellent graduate students' scientific research ability. *Graduate education research* 2: 13-18.
- [3] Pei CG, Song NQ, Liu QH, Mou SX (2018) Construction and verification of evaluation index system of interest in Mathematics Learning. *Journal of Mathematics Education* 27 (02): 70-73.
- [4] Zhao HY (2019) Preliminary exploration of teaching reform for graduate students majoring in mathematics. *Science and Technology* 3: 19 + 25.
- [5] Wang J (2017) Practice and Application of Dichotomous Classroom in the Teaching of Mathematics. *Curriculum Education Research* 46: 140.
- [6] Wang HY (2016) Exploration and practice of training mode of graduate students' innovative ability in mathematics. *Journal of Liaoning University of Technology (Social Science Edition)* 18 (04): 111-113.
- [7] Liu QH, Jia LL (2011) Thoughts on the Cultivation of Creative Ability of Graduate Students in Mathematics. *Science Education Wenhui (Late Issue)* 8: 90-91 + 124.
- [8] Xu SY, Hong GS, Jiang XH, Ding LQ (2009) Research and Practice on Bilingual Teaching of Mathematics Graduate Courses. *Journal of Huaibei Coal Industry Teachers College (Natural Science Edition)* 30 (02): 76-81.
- [9] Li N, Wang XM (2001). *Learn to learn*. Nanjing: Southeast University Press, 133-137.
- [10] Wu HY, Liu XL (2017) The compilation and current situation of the questionnaire on junior high school students' interest in Mathematics Learning. *Journal of Mathematics Education* 26 (02): 50.
- [11] Pei CG, Song MZ, Liu QH, Guo YF (2017) "Current situation", "problems" and "countermeasures" of the development of primary school students' interest in Mathematics Learning -- Based on the investigation and research of Chongqing. *Journal of Mathematics Education* 26 (03): 62-67-54.
- [12] Li HY, He Yisu (1999). *Learning motivation*. Wuhan: Hubei Education Press, 343.
- [13] Zhao WH (2009) On the Cultivation of Junior Middle School Students' English Learning Interests. *Journal of Dalian Education University* 25 (1): 60.
- [14] Huang H (2004). *Research on Middle School Students' Mathematics Learning Interest*. Wuhan: Central China Normal University.
- [15] Peng HW (2012). *Research on the cultivation of junior high school students' interest in Mathematics Learning*. Changchun: Northeast Normal University.