American Journal of Business and Society
Vol. 6, No. 1, 2021, pp. 14-20
http://www.aiscience.org/journal/ajbs

The Satisfaction of Chinese Students Majoring in Mathematics and Applied Mathematics Towards Undergraduate Curriculum Setting

Liyan Yin, Zezhong Yang*

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

Abstract

Curriculum setting plays a key role in cultivating undergraduate talents in universities. Through the satisfaction survey of the relevant curriculum setting, we can intuitively understand whether the curriculum meets the needs of students, and provide a reference for the evaluation and reform of the curriculum. In this paper, by consulting related literature, we have an understanding of the definition and characteristics of curriculum and student satisfaction. Then I referred to the training program of mathematics and applied mathematics at Shandong Normal University in China, and finally compiled a questionnaire. We found that most Chinese students majoring in mathematics and applied mathematics are satisfied with the undergraduate curriculum, and their satisfaction is very high. They are very satisfied with the subject setting and hours setting of each subject. Besides, among the four aspects of the arrangement of course content, the setting of subject hours, the order of subject arrangement, and subjects, students have the highest satisfaction with the order of subject arrangement. Through investigation and statistics, we also found that the satisfaction degree of Chinese students majoring in mathematics and applied mathematics with general mathematics course is the highest among the five types of course, which includes general education course, general education course in teaching, general mathematics course, mathematics course, and practical course. But some Chinese students majoring in mathematics and applied mathematics are dissatisfied with the subject setting of the general education courses in teaching.

Keywords

Undergraduate Students, Major in Mathematics and Applied Mathematics, Curriculum Setting, Student Satisfaction

Received: November 30, 2020 / Accepted: December 22, 2020 / Published online: January 11, 2021

1. Introduction

The major of mathematics and applied mathematics is mainly for universities, middle schools, primary schools, and research institutes to train professional talents and outstanding mathematics teachers and researchers [1-2]. The curriculum setting is the key to the cultivation of undergraduate students in higher education [3-4]. Reasonable curriculum setting can not only meet the needs of students' development but also meet the school's training objectives and improve the quality of talents [5-6]. Therefore, the survey of satisfaction with related curriculum settings can provide a very intuitive understanding of whether the curriculum settings meet the needs of students, and at the same time provide a reference for the evaluation and reform of curriculum settings. However, the research on curriculum satisfaction in our country started very late [7], and there are very few surveys of the satisfaction on the curriculum of mathematics and applied mathematics students. On this basis, this article uses questionnaire surveys and other methods to investigate the satisfaction of students to the undergraduate curriculum setting, whose major is mathematics and applied mathematics. This survey can not only help schools understand the satisfaction state of students with the curriculum but also understand the needs of students majoring in mathematics and applied mathematics from the perspective of students. So, we perhaps get some ideas for the reform of the school curriculum

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

system and improve the curriculum quality, and ultimately promotes the cultivation of mathematics and applied mathematics professionals.

The question studied in this article is that how satisfied are the mathematics and applied mathematics students with the undergraduate curriculum?

Specifically, the satisfaction of the curriculum includes two dimensions: satisfaction with course hours and satisfaction with subjects. The satisfaction with hours setting of each subject s involves three aspects, which are satisfaction with course content, subjects, and subject arrangement order.

2. Literature Review

In order to improve the quality of mathematics and applied mathematics courses and promote the development of students, many Chinese scholars have put forward many suggestions from different angles to promote mathematics and applied for mathematics courses. For example, Chen believes that we need to change the teaching mode accordingly starting from the reality of the teaching content of the course, and to improve the teaching method to meet the needs of the course [8]; Xiang believes that theoretical courses and practical course should be balanced, and curriculum modules with employment characteristics should be appropriately added to cultivate students' practical ability [9]; Wang and Wu proposed to promote the research and practice of mathematics and applied mathematics curriculum reform by holding subject competitions [10].

Regarding the survey of satisfaction with curriculum setting, most of the current surveys in China involved MBA graduate course satisfaction [7], tourism management professional curriculum satisfaction [11], and preschool education professional curriculum satisfaction survey [12], etc. There are very few surveys on the satisfaction of students to courses setting of mathematics and applied mathematics in China.

From the above, we can see that different scholars in China have proposed methods from different perspectives, which involved course content and course hours, to improve course quality. Some scholars have also paid attention to the field of the curriculum setting of mathematics and applied mathematics. However, in the current research, most scholars use theoretical methods rather than practical methods to analyze the rationality of the curriculum. In addition, researchers tend to analyze problems from the perspective of teachers rather than students for making suggestions. Therefore, this article attempts to investigate the satisfaction of Chinese mathematics and applied mathematics students with the undergraduate curriculum through the questionnaire survey. We tempt this practical research method and use quantitative research method to analyze the satisfaction of various aspects of the curriculum setting. In this way, we can understand students' needs for curriculum setting from the perspective of students, and provide ideas for the reform of mathematics and applied mathematics curriculum system.

3. Theoretical Basis

3.1. Student Satisfaction

According to the definition given in "Theory of Curriculum" by Chen Xia, the representative of China's well-known curriculum theory: The curriculum setting generally refers to the subjects offered in school and the setting of course hours [13].

Student satisfaction is formed by introducing customer satisfaction in the field of sales into the field of higher education [14-15]. There are different opinions on student satisfaction [16-17]. There are two main viewpoints currently recognized by us in China. One is that satisfaction comes from attitudes, which represents a view of students' learning and life [11, 18]. The other is that satisfaction comes from attitude needs, which represents the feeling after comparing the reality of school life and their expectations [11, 19]. This article is based on the definition of customer satisfaction by Philip Kotler, a world marketing authority. He thought customer satisfaction refers to a state of feeling, which came from the comparison between their expectations and the perceivable effects of services, activities, situations, processes of all products [16]. Therefore, the definition of student satisfaction is more inclined to the second statement mentioned above [11, 19].

According to the research of relevant scholars, the definitions of "curriculum setting" and "student satisfaction" given above, the definition of "students' satisfaction with curriculum setting" is now given as the students' feelings about the actual situation of the subjects offered by the school and the hours of each subject compared with their own expectations.

3.2. Ideas for Questionnaire Design

First of all, according to the definition of "curriculum setting" given by relevant scholars [13], the curriculum setting is divided into two dimensions: subject setting and hours setting of each subject. The subject set can be further divided into three aspects: the content of the subject, the subjects, and the arrangement order of the subjects. Therefore, the setting of the subject includes the two dimensions and four aspects, which are course content, the setting of subject hours, the order of subject arrangement, and subjects [15]. Secondly, according to the college mathematics and applied mathematics professional training program [22], all the courses offered during the undergraduate period of mathematics and applied mathematics are divided into five categories, which includes general education course, general education course in teaching, general

mathematics course, mathematics course, and practical course. Therefore, this article adopts the questionnaire survey method to investigate the satisfaction of students with the undergraduate curriculum. The satisfaction of the above five types of courses is investigated from four aspects: the content of the subject, the subjects, and the arrangement order of the subjects. Satisfaction is divided into 5 levels, including very satisfied, satisfied, uncertain, dissatisfied, and very dissatisfied.

4. Methods

4.1. Samples

The sampling method of this survey is simple random sampling, taking Chinese mathematics and applied mathematics students as a population. Students majoring in mathematics and applied mathematics at Shandong Normal University are the samples of this survey. A total of 50 senior students in this major were randomly selected by us.

4.2. Instrument

This survey uses the questionnaire survey method. There are 20 questions in this questionnaire. These questions relate to the satisfaction of the five types of courses. In the questionnaire, questions 1-4 are about general education course in schools; questions 5-8 are about general education course in teaching; questions 9-12 are about general mathematics course; questions 13-16 are about mathematics courses; questions 17-20 are about practical course. We will set four questions under each type of course. These questions survey students' satisfaction with the hours of each subject, the content of the subjects, the order of subjects, and the arrangement of the subjects.

4.3. Data Processing

A total of 50 questionnaires were distributed in this survey and 50 questionnaires were returned. Through screening, we removed 7 invalid questionnaires and a total of 43 valid questionnaires. Next, I will make detailed statistics on each question in the questionnaire. First, we count the frequency and percentage of each option in each question. Those data can reflect the general situation of student satisfaction. Secondly, the level of the average can intuitively reflect the level of overall satisfaction in this respect. In order to carry out detailed quantitative statistics on the degree of satisfaction, a certain score is assigned to each degree of satisfaction. The scores assigned to the 5 satisfaction levels are 5 points for very satisfied, 4 points for satisfaction, 3 points for uncertain, 2 points for dissatisfaction, and 1 point for very dissatisfied. By assigning points, we will calculate the average satisfaction for each question. Finally, in order to systematically analyze and compare the satisfaction of each type of course, as well as the satisfaction of all aspects of the curriculum, we will calculate the average of each aspect based on the average of the satisfaction score of each question.

5. Results

In this article, I have counted the frequency of each situation of the questionnaire results and calculated the corresponding percentage, and then calculated the average value of the satisfaction score for each question and each aspect. Now we will conduct a detailed analysis of all aspects of the data.

5.1. Analysis of Satisfaction in Four Aspects of Courses Setting

According to the questionnaire, the 20 questions involved a total of four aspects of the curriculum setting, including the course content, the setting of subject hours, the order of subject arrangement, and subjects. Now we will analyze the satisfaction of the four aspects in detail.

(1) Satisfaction Analysis of Subject Hours

The serial numbers in the questionnaire are 1, 5, 9, 13, and 17, these five questions investigate students' satisfaction with the hours of each subject. According to data statistics, the average scores of the 5 questions are all greater than 3.8 points, and the satisfaction average of the hours of each subject is 4.16. These data indicate that most students are highly satisfied with the setting of the hours of each subject. However, it is worth noting that 18.60% of the students are dissatisfied with the setting of hours of general education course in teaching, which shows that some students are not satisfied with the hours of the general education course in teaching. Detailed statistics are shown in Table 1:

Table 1. Satisfaction Statistics of the Hours of Each Subject.

Course Type	General Education Course	General Education Course in Teaching	General Mathematics Course	Mathematics Course	Practical Course
Question Number	1	5	9	13	17
The Proportion of “Very Satisfied” (%)	39.53	32.56	48.84	27.91	37.21
The Proportion of “Satisfied” (%)	48.84	34.88	48.84	60.47	39.53
The Proportion of “Uncertain” (%)	9.30	13.95	2.33	9.30	23.26
The Proportion of “Dissatisfied” (%)	2.33	18.60	0	2.33	0
The Proportion f “Very Dissatisfied” (%)	0	0	0	0	0
Average	4.26	3.81	4.47	4.14	4.14
The Overall Average	4.16				

(2) Analysis of Subject Satisfaction

The serial numbers in the questionnaire are 2, 6, 10, 14, and 18, these five questions investigate students' satisfaction with the subjects. According to the data, it can be seen that the average satisfaction scores of the 5 questions are all greater than 4 points, and the average score of the students' satisfaction with the subjects is 4.27, which shows that most students are very satisfied with the setting of the subjects. Besides, students have the highest satisfaction of subjects in the general mathematics course, with an average score of 4.53, and 55.81% of students choose very "satisfied". Detailed statistics are shown in Table 2:

Table 2. Satisfaction Statistics of Subjects.

Course Type	General Education Course	General Education Course in Teaching	General Mathematics Course	Mathematics Course	Practical Course
Question Number	2	6	10	14	18
The Proportion of "Very Satisfied" (%)	34.88	32.56	55.81	39.53	32.56
The Proportion of "Satisfied" (%)	60.47	53.49	41.86	51.16	46.51
The Proportion of "Uncertain" (%)	4.65	11.63	2.33	4.65	18.60
The Proportion of "Dissatisfied" (%)	0	2.33	0	4.65	2.33
The Proportion f "Very Dissatisfied" (%)	0	0	0	0	0
Average	4.30	4.16	4.53	4.26	4.09
The Overall Average	4.27				

(3) Analysis of Satisfaction with Course Content

The serial numbers in the questionnaire are 3, 7, 11, 15, and 19, these five questions investigate students' satisfaction with the course content. According to the data, it can be seen that the average satisfaction of the 5 questions in the course content is all greater than 4 points, and the average satisfaction of the course content setting is 4.26, which shows that most students are satisfied with the curriculum content setting. Besides, students are the most satisfied with the two types of course (questions 11 and 15) are the general mathematics course and the mathematics course, with an average score of 4.37. Detailed statistics are shown in Table 3:

Table 3. Satisfaction Statistics of Course Content.

Course Type	General Education Course	General Education Course in Teaching	General Mathematics Course	Mathematics Course	Practical Course
Question Number	3	7	11	15	19
The Proportion of "Very Satisfied" (%)	32.56	27.92	51.16	48.84	41.86
The Proportion of "Satisfied" (%)	62.79	55.81	41.86	41.86	34.88
The Proportion of "Uncertain" (%)	4.65	13.95	4.65	6.98	23.26
The Proportion of "Dissatisfied" (%)	0	2.38	0	2.33	0
The Proportion f "Very Dissatisfied" (%)	0	0	0	0	0
Average	4.28	4.09	4.37	4.37	4.19
The Overall Average	4.26				

(4) Satisfaction Analysis of Subject Arrangement Order

The serial numbers in the questionnaire are 4, 8, 12, 16, and 20, these five questions investigate students' satisfaction with the order of subject arrangement. According to the data, it can be seen that the average of the 5 questions is greater than 4 points, and the overall satisfaction of the order of teaching subjects. The average is 4.28 points, which shows that most students are very satisfied with the order of subject arrangement. Besides, students were satisfied with the order of arrangement of the general mathematics course (Question 12), with an average score of 4.51. The detailed statistics are shown in Table 4:

Table 4. Satisfaction Statistics in the Order of Subject Arrangement.

Course Type	General Education Course	General Education Course in Teaching	General Mathematics Course	Mathematics Course	Practical Course
Question Number	4	8	12	16	20
The Proportion of "Very Satisfied" (%)	32.56	37.21	53.49	41.86	41.86
The Proportion of "Satisfied" (%)	58.14	53.49	44.19	44.19	34.88
The Proportion of "Uncertain" (%)	9.30	9.30	2.33	9.30	23.26
The Proportion of "Dissatisfied" (%)	0	0	0	4.65	0
The Proportion f "Very Dissatisfied" (%)	0	0	0	0	0
Average	4.23	4.28	4.51	4.23	4.16
The Overall Average	4.28				

(5) According to the analysis of the above four aspects, most students are very satisfied with the four aspects of the curriculum setting. According to statistical data, we can intuitively find that students have the highest degree of satisfaction with the order of mathematics curriculum. The satisfaction average of each aspect are statistics as shown in Table 5:

Table 5. Satisfaction Statistics of Four Aspects under the Curriculum.

Four Aspects of Curriculum Setting	Average
The Setting of Subjects hours	4.16
Course Content	4.26
Subjects	4.27
Order of Subject Arrangement	4.28

(6) In the previous analysis, we analyzed that students have the highest satisfaction with each aspect of the curriculum of general mathematics course. Combining the data in Table 6 below, it can be seen that the average of the general mathematics course is the highest. Therefore, we can conclude that the setting of the general mathematics course is the highest satisfaction among the five types of courses. The detailed statistics are as follows in Table 6:

Table 6. Satisfaction Statistics of Various Courses.

Course Type	Average
General Education Course	4.27
General Education Course in Teaching	4.09
General Mathematics Course	4.47
Mathematics Course	4.25
Practical Course	4.15

5.2. Satisfaction Analysis of Two Dimensions of the Curriculum Setting

According to the definition of the curriculum, the 20 questions in the questionnaire involve four aspects of the curriculum, which are classified as two dimensions. Course content, subjects, and order of subject arrangement belong to the dimension of the subject set. Therefore, on the basis of the above analysis of the four aspects of the curriculum, we can further analyze the satisfaction of these two dimensions under the curriculum.

(1) In terms of the setting of course hours, the satisfaction average of the five types of courses is greater than 3.8 points, and the satisfaction average of the course hours is 4.16 points. It can be concluded that most students are satisfied with the arrangement of the hours set for each subject is very high.

(2) The satisfaction average of the three aspects of the subject setting, the subjects, the content of the subjects, and the arrangement order of the subjects are all greater than 4 points, so most students are very satisfied with the setting of subjects.

5.3. Analysis of Satisfaction with the Curriculum Setting

According to the above analysis of student satisfaction in all aspects of the curriculum, it is shown that most Chinese students majoring in mathematics and applied mathematics are very satisfied with the curriculum set. Therefore, we can conclude that most students majoring in mathematics and applied mathematics are very satisfied with the undergraduate setting of the curriculum.

6. Discussion

Through the investigation and statistics, the following results are obtained:

(1) Through the collection and statistics of the 20 questions in this questionnaire, the average of the 20 questions in the questionnaire is greater than 3.8 points, which shows that most students are satisfied with five aspects of courses. It is worth noting that 18.60% of students are dissatisfied with the hours of general education course in teaching, which leads to the satisfaction average of the hours of general education course in teaching more than other types of courses. This information indicates that some students are not satisfied with the arrangement of hours of general education course in teaching.

(2) The statistical results of the survey show that the average of the four aspects of the curriculum setting, including the course content, the setting of subject hours, the order of subject arrangement, and subjects are all greater than 4 points, and the average satisfaction in the order of subject arrangement is higher than the other three aspects. Obviously, most students have a high degree of satisfaction with these four aspects, and students have the highest satisfaction with the arrangement of subjects. In addition, the average satisfaction of the general mathematics course is not only the highest among the five types of courses but also the highest in every aspect of the curriculum. It can also be concluded that students have the highest satisfaction with the curriculum of the general mathematics course.

(3) According to the definition of the curriculum in this article, the content of the curriculum, the subjects opened by the school, and the order of subject arrangement belong to the dimension of the subject set, so most students are also very satisfied with the subject set. The average of students' satisfaction with the hours set for each subject is 4.16 points. The above all show that most students are very satisfied with the curriculum setting of mathematics and applied mathematics. The results of this study are consistent with the results of previous related studies. For example, scholar Hou found that students' course satisfaction is generally high [23]. Scholar Yu also concluded that students' satisfaction with courses has reached the middle level or above [24]. Therefore, we conclude that most students majoring in Chinese mathematics and applied mathematics are satisfied with the undergraduate curriculum, and the satisfaction of Chinese

students majoring in mathematics and applied mathematics is very high.

7. Conclusion

Through this questionnaire survey and analysis of the results of the survey, we can conclude that most Chinese students majoring in mathematics and applied mathematics are satisfied with the undergraduate curriculum, and their satisfaction is very high. They are very satisfied with the subject setting and hours setting of each subject. Besides, among the four aspects of the arrangement of course content, the setting of subject hours, the order of subject arrangement, and subjects, students have the highest satisfaction with the order of subject arrangement. Through investigation and statistics, we also found that the satisfaction degree of students with general mathematics course is the highest among the five types of courses, which includes the general education course, general education course in teaching, general mathematics course, mathematics course, and practical course. But some Chinese students majoring in mathematics and applied mathematics are dissatisfied with the subject setting of the general education course in teaching**.**

There are still shortcomings in this survey. The subjects of this survey are senior students who have only completed the courses of the first three years. This may cause their evaluation to be not completely objective. Secondly, there will be some differences between the satisfaction of students after graduation and the satisfaction of studying in school [25]. The evaluation of the satisfaction of the graduated students of the undergraduate course is also worthy of reference and research. Therefore, on this basis, the survey should be expanded to involve more students of different colleges, and the students who have graduated from mathematics and applied mathematics should also be taken into account, which will make the survey more comprehensive and in-depth. This is where we should improve in the next investigation.

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] Wu J. (2016). Research on the Training Mode of Applied Talents in Mathematics and Applied Mathematics. *Overseas Students*, 30(01), 184.

[2] Zhang K. (2020). Research on the Training Mode of Applied Talents in Mathematics and Applied Mathematics under the Background of Curriculum Reform. J*ournal of Liaoning Economy Vocational and Technical College. Journal of Liaoning Economic Management Cadre College*, 22(01), 131-133.

[3] Huang W. (2003). Teacher Education System. Guangzhou: Higher Education Press in Guangzhou.

[4] Wu J. (2016). Wu J. (2016). A Reflective Study on the Curriculum of Pre-service Teacher Education. Shanxi Normal University.

[5] Shi J. H. (2004). Research on the Curriculum Setting of Teacher Education. *Journal of Zhejiang Wanli University,* 29(06), 153.

[6] Song J. J. & Wan X. L. (2020). A Survey of Satisfaction with the Setting of Accounting Courses in Colleges and Universities in the Digital Economy Era—Taking JX University as an Example. *Financial Management Research*, 69(08), 77-78.

[7] Liu Y. S. (2020). MBA Graduate Course Satisfaction Survey——Take H University as an Example. Hebei University. doi:10.27103/d.cnki.ghebu.2020.000629

[8] Chen X. (2020). Curriculum Design and Practice Exploration of Introduction to Mathematics and Applied Mathematics. *Education Teaching Forum*, 12(31), 24.

[9] Xiang X. X. (2019). Curriculum Reform and Exploration of Mathematics and Applied Mathematics under the Background of Transition. Chongqing: Ding Yun Culture Communication Co., Ltd in Chongqing.

[10] Wang S. Q & Wu Y. S. (2018). Research and Practice on Promoting Curriculum Reform of Mathematics and Applied Mathematics by Subject Competition. *Journal of Literature and reading*, 5(01), 196.

[11] Liu J. J (2020). Investigation Report on Satisfaction and Optimization of Vocational Tourism Professional Courses under the Concept of Quality Education. Hunan Normal University. doi: 10.27137/d.cnki.ghusu.2020.001514.

[12] Huang X. L. & Liu X. L. (2019). Investigation and Research on Satisfaction of Undergraduate Curriculum of Preschool Education. *New Education*, 17(01), 38.

[13] Chen X. (1989). Curriculum Theory. Beijing: People's education Press.

[14] Yang Z. X. (2014). Investigation and Research on Satisfaction of Higher Vocational Courses. Hunan Normal University.

[15] Zhao Z. H. (2020). Research on Influencing Factors of Student Satisfaction in Modern Educational Technology Course Based on Outcome-oriented Yunnan Normal University. doi:10.27459/d.cnki.gynfc.2020.000155.

[16] Qian L H. (2019). Research on Evaluation of Undergraduate Course System Based on Satisfaction. Beijing University of Chemical Technology. doi: 10.26939/d.cnki.gbhgu.2019.001191.

[17] Zheng X. N. (2012). Research on Undergraduate Teaching Quality from the Perspective of Student Satisfaction. Jiangxi Normal University.

[18] Yang Q. M. & Shui G. H. & Li Z. &You B. (2014). Investigation on the "Satisfaction" of College Students in Chongqing. *Probe*, 36 (01), 92-94. doi: 10.16501/j.cnki.50-1019/d.2003.01.028.

[19] Tian X. Z. & Wang X. L. (2007). Investigation and Analysis of College Students' Satisfaction. *Higher Education Exploration*, 36 (05), 126-128.

[20] Sun L. H. (2003). Theoretical Research on Customer Satisfaction. *Journal of Northeast Normal University (Philosophy and Social Sciences)*, 70 (04), 18.

[21] Chen L. M. (2020). Investigation and Research on Satisfaction of Practical course of Master's Degree in Full-time Primary Education. Southwest University. doi: 10.27684/d.cnki.gxndx.2020.003279

[22] School of Mathematics and Statistics, Shandong Normal University (December 14, 2019). Training Program of Mathematics and Applied Mathematics in Shandong Normal University. *Official website of Shandong Normal University School of Mathematics and Statistics.* Retrieved November 24, 2020, from http://www.maths.sdnu.edu.cn/info/1024/3508.htm.

[23] Hou M. D (2016). Fuzzy Comprehensive Evaluation of Higher Mathematics Course Satisfaction. *Journal of Mudanjiang Normal University (Natural Sciences Edition)*, 46 (02), 72-73. doi: 10.13815/j.cnki.jmtc(ns).2016.02.029

[24] Yu Y. J (2014). Investigation and Research on University Course Satisfaction. *Survey of Education*, 3(13), 1-3. doi: 10.16070/j.cnki.cn45-1388/g4s.2014.05.016

[25] Gong F. (2012). Focus on the quality of undergraduate education: Pay attention to the "student satisfaction" survey. *Jiangsu Higher Education*, 35(01), 1-4. doi: 10.13236/j.cnki.jshe.2012.01.068.