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The Impact of Perceived Service Quality on Student Learning Outcomes — A Case Study of a Chinese-foreign Joint Educational Program

LI Zhipeng

Doctor of Management

Supervisors:
PhD Nelson António, Professor,
ISCTE University Institute of Lisbon
PhD Xiao Wen, Professor,
University of Electronic Science and Technology of China

December, 2022

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Abstract

As an important part of the internationalization of higher education, Chinese-foreign cooperation in running schools plays an increasingly important role. However, Chinese-foreign cooperation in running schools lacks a comprehensive or systematic evaluation of student services, and the relationship between service quality and learning outcomes is still unclear. Combining the current situation and the recommendations of expert inquiries, this thesis selects suitable service quality indicators and constructs a Chinese-foreign cooperation education service quality evaluation scale that includes 25 indicators in five dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. According to the evaluation scale, questionnaires were distributed in Glasgow College of University of Electronic Science and Technology of China. Then SPSS software was used for statistical, reliability, validity and quality gap analyses of the data to get countermeasures and suggestions to narrow down the education service differences. In addition, empirical regression analysis was used to study the relationship and the influence mechanism between service quality and students' learning performance. The results show that: perceived service quality positively affects learning outcomes; student satisfaction plays a mediating role in perceived service quality and learning outcomes; and international interaction participation positively moderates the relationship between perceived service quality and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction. Based on the results of the empirical study, it is of practical significance to offer suggestions for the future development of Chinese-foreign joint educational programs.

Keywords: Perceived Service Quality; Student Learning Outcome; Chinese-foreign cooperation in running schools

JEL: I21; L84

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Resumo

A cooperação sino-estrangeira na administração de escolas desempenha um papel cada vez mais importante na internacionalização na educação universitária. Contudo, a cooperação sino-estrangeira na administração de escolas necessita de uma avaliação sistemática e compreensiva dos serviços prestados aos estudantes e a relação entre a qualidade dos serviços e os resultados de aprendizagem não tem sido matéria de investigação. Combinando a situação atual com as recomendações de especialistas, esta tese selecionou um conjunto adequado de indicadores de qualidade e contruiu uma escala de avaliação da qualidade da educação sino- estrangeira que inclui 25 indicadores em cinco dimensões: Tangibilidade, Confiabilidade, Capacidade de Resposta, Garantia e Empatia. Os questionários foram distribuídos no *Glasgow College of University of Electronic Science and Technology of China* e o SPSS foi utilizado para analisar a fiabilidade, validade e os gaps de qualidade. Após a análise dos gaps de qualidade foram feitas sugestões no sentido de os estreitar. A análise de regressão foi utilizada para para estudar a relação e o mecanismo de influência entre a qualidade do serviço e o desempenho de aprendizagem dos estudantes. Os resultados mostram que: a qualidade de serviço percebida afeta positivamente os resultados de aprendizagem; a satisfação dos alunos desempenha um papel mediador entre a qualidade de serviço percebida e os resultados de aprendizagem; e a participação em interações internacionais modera a relação entre a qualidade de serviço percebida e a satisfação de aprendendizagem, isto é, quanto maior a participação em interações internacionais, maior é a relação positiva entre a qualidade de serviço percebida e a satisfação de aprendizagem. Tendo por base os resultados da investigação foram propostas algumas sugestões para a melhoria dos programas oferecidos pelo *Glasgow College.*

Palavras-Chave: Qualidade Serviço Percebida; Resultados de Aprendizagem; Cooperação Sino-estrangeira na administração de Escolas

JEL: I21; L84

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摘　要

作为高等教育国际化的重要组成部分，中外合作教育发挥越来越重要的作用。然而，中国的合作教育缺乏对学生服务的全面系统评价，服务质量与学习成果之间的关系没有得到体现。结合中国中外合作办学的现状及专家问询建议，本文选取适合的服务质量指标，构建包括有形性、可靠性、响应性、保证性、及移情性五个维度 25 个指标的中外合作办学服务质量评价量表。根据评价量表选择在电子科技大学格拉斯哥学院发放问卷，运用 SPSS 软件对采集的数据进行统计分析、信度分析、效度分析以及质量差距分析，提出减少中外合作办学服务差距的对策建议。此外，采用实证回归分析的方法研究服务质量与学生学习成绩之间的关系以及影响机制。研究结果表明：感知服务质量及其五个维度都正向影响学习结果；学生满意度在感知服务质量及其五个维度之间起到中介作用；国际互动的参与正向调节服务感知质量及其五个维度与学习满意度之间的关系，即国际互动参与度越高，服务感知质量与学习满意度之间的正向关系越强。根据实证研究结果，为中外合作办学院校的未来发展改进建议和措施，具有一定现实意义。

关键词：服务质量；学习结果；中外合作办学

JEL: I21; L84

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Acknowledgements

During the years of my doctoral study, I worked and studied at the same time. The literature piled up together and the pressure kept driving me to move forward. I am very lucky to have the tolerance and care of Professor Nelson António and Professor Xiao Wen, the careful guidance of Professor Virginia Trigo, and the support of teachers and colleagues. After years of hard work, I finally finished the thesis. In the process of learning and writing my doctoral thesis, they reminded me all the time, urged me and supervised me, and gave me a lot of meaningful suggestions on the structural theory expression. I would like to thank the teachers for their love and hard work in reviewing my doctoral thesis word by word. I always bear in mind the advice of my teachers that a doctoral thesis must be completed with enough effort. Although the result may not be perfect, the process of writing gave me a lot of rare harvest and accumulation of experience, which is a spur, a driving force and a harvest for me to further improve my research level in the future and to achieve a higher level in the field of international education research. I would like to thank the three professors for their tireless teaching, which is the treasure of my life.

The training in the doctoral study stage is a very important experience and a valuable asset to my life. Thanks to the leaders and colleagues of the University of Electronic Science and Technology of China for their understanding and support, so that I can finish my studies while working. I would also like to thank my research subjects and project teachers for their support, which enabled me to conduct questionnaire research and collect data smoothly.

In recent years, the support and encouragement of my family and friends have also been an important driving force for me to finish my studies. My family has always paid attention to and supported my studies, and my friends have urged me to step up my thesis writing from time to time. I want to thank them for their selfless support and care. Especially my dear daughter, you are my source of motivation

Finally, I would like to express my sincere thanks to all the experts who took time out of their busy schedule to review and defend my thesis for their guidance.

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致　谢

在博士研究生学习的这几年时光里，我在工作的同时不断努力学习，文献堆积在一起，压力一直驱使我向前迈进。很幸运，有导师 Nelson António 教授、肖文教授对我的宽容和关爱，有 Virginia Trigo 教授对我文章的悉心指导，有各位老师和同事的支持，经过这几年的努力，我终于完成了博士论文。在知识学习和论文写作的过程中，教授们都无时无刻不在提醒我、督促我、监督我，对论文的结构和理论表达等给了很多有益的建议。感谢老师们的厚爱，不辞辛劳，一字一句地批阅我的博士论文。我时时刻刻都牢记老师们的忠告，博士论文一定要付出足够多的努力才能完成。虽然结果未必尽善尽美，但是学习和写作的过程给了我许多难得的收获和经验的积累。这对于我以后进一步提高研究的水平，让我在学习的道路上更上一个台阶，是一项鞭策，是一股动力，也是一份收获。谢谢三位教授孜孜不倦的教诲，这是我一生的财富。

博士学习阶段的训练是一段很重要的经历，这段经历尤为珍贵。感谢电子科技大学的领导和同事的理解和支持，使我能够在工作的业余时间，完成学业。我也要感谢参与此项研究的学生们和项目老师们，由于你们的支持，使我得以顺利进行问卷研究和数据收集并提交论文。

这几年来，家人和朋友的支持和鼓励也是促使我完成学业的重要动力，我的家庭始终关注和支持我的学业，朋友们也不时敦促我加紧论文的写作，我要感谢他们无私的支持和关爱。特别是我的女儿，你是我动力的源泉。

最后，衷心感谢在百忙中对论文进行评审和答辩的各位专家对我的论文予以指导。

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Contents

Chapter 1: Introduction 1
1.1 Research background 1
1.1.1 Internationalization of higher education 1
1.1.2 Educational service quality management 3
1.1.3 Chinese-Foreign cooperation education 4
1.1.4 Glasgow School of University of Electronic Science and Technology of China 7
1.2 Research problem and questions 8
1.2.1 Research problem 8
1.2.2 Research questions 9
1.2.3 Research difficulties 9
1.3 Research significance 9
1.3.1 Theoretical significance 10
1.3.2 Practical significance 11
1.4 Research method 12
1.4.1 Literature research method 12
1.4.2 Model study method 12
1.4.3 Questionnaire survey method 13
1.4.4 Empirical research method 13
1.4.5 Research technology route 13
1.5 Research structure 15
Chapter 2: Literature Review 19
2.1 Quality management 19
2.1.1 Quality management theory 19
2.1.2 Empirical study on quality management 21
2.1.3 Total quality management 21
2.2 Service quality 23
2.2.1 Evaluation of service quality 23
2.2.2 Service quality evaluation method 25
2.2.3 SERVQUAL model application 27
2.2.4 Evaluation of service quality of higher education 28

2.3 Service quality and satisfaction 29
2.3.1 Student satisfaction 31
2.3.2 Higher education service quality and student satisfaction 36
2.4 Learning outcomes 42
2.4.1 Definition of learning effectiveness 42
2.4.2 Evaluation of Learning Effectiveness 43
2.5 Chinese-foreign cooperation in running schools. 45
2.5.1 Motivation and significance of Chinese-foreign cooperation education 45
2.5.2 Development status of Chinese-foreign cooperative education programs 48
2.5.3 Evaluation of service quality of Chinese-foreign cooperation in running schools 50
2.5.4 Evaluation of learning outcomes in Chinese-foreign cooperation in running schools 51
2.5.5 Service quality and learning outcomes of Chinese-foreign cooperation in running schools. 54
2.6 Chapter summary 56
Chapter 3: Research Methods 59
3.1 Basic elements 59
3.1.1 Perceived service quality 59
3.1.2 International interaction participation 59
3.1.3 Student satisfaction 60
3.1.4 Learning outcomes 60
3.2 Research conceptual model 61
3.2.1 Service quality evaluation 61
3.2.2 Student satisfaction and learning outcomes. 62
3.2.3 International interactive participation in Chinese-foreign cooperative educational programs 62
3.2.4 Research conceptual model 63
3.3 Research hypotheses 64
3.3.1 Perceiving service quality and learning outcomes. 64
3.3.2 The mediating role of student satisfaction 65
3.3.3 The moderating role of international interaction participating 67
3.4 Questionnaire design 68
3.4.1 Determine the dimensions. 69
3.4.2 Specify the types of investigation methods 70

3.4.3 Determine the structure and order of the questions 70
3.4.4 Determine the format and layout of questions and answers 72
3.4.5 Written expression, tone and answer time of the questionnaire 72
3.4.6 Pre-survey for testing questionnaires and eliminating defects 72
3.5 SERVQUAL model of Chinese-foreign cooperative education project 73
3.5.1 Definition of tangibles 74
3.5.2 Definition of quality of reliability 75
3.5.3 Definition of quality of responsiveness 76
3.5.4 Definition of quality of assurance 78
3.5.5 Definition of quality of empathy 79
3.6 Variable measurement 80
3.6.1 Quality of tangibles 81
3.6.2 Quality of reliability 82
3.6.3 Quality of responsiveness 83
3.6.4 Quality of assurance 85
3.6.5 Quality of empathy 86
3.6.6 International interaction participation 87
3.6.7 Student satisfaction 88
3.6.8 Student learning outcome 88
3.7 Chapter summary 89
Chapter 4: Data Analysis 91
4.1 Sample information statistics 91
4.2 Reliability test of the questionnaire 92
4.2.1 Reliability analysis of tangibles 93
5.2.2 Reliability analysis of reliability 94
4.2.3 Reliability analysis of responsiveness 95
4.2.4 Reliability analysis of assurance 96
4.2.5 Reliability analysis of empathy 97
4.2.6 Reliability analysis of inter-participation 98
4.2.7 Reliability analysis of student satisfaction 99
4.2.8 Reliability analysis of total scale 100
4.3 Validity test of the questionnaire 100
4.4 Difference analysis of service quality 102
4.5 Correlation analysis and regression analysis 105
4.5.1 Correlation analysis 105

4.5.2 Benchmark regression 106
4.5.3 Mediating effect regression 112
4.5.4 Moderating effect regression 114
4.6 Chapter summary 119
Chapter 5: Conclusion and Discussion 121
5.1 Research Conclusion 121
5.2 Discussion and Suggestion 122
5.2.1 Tangibles 123
5.2.2 Reliability and Responsiveness 124
5.2.3 Assurance and Empathy 125
5.2.4 International interactive participation 125
Bibliography 127
Appendix A: Questionnaire 141
Appendix B: Attached Table 1 145
Appendix C: Attached Table 2 147
Appendix D: Attached Table 3 149
Appendix E: Attached Table 4 151
Appendix F: Attached Table 5 153

List of Tables

Table 3.1 Summary of service quality dimension 73
Table 3.2 Measurement items of tangibles in education field 81
Table 3.3 Measurement items of reliability in the field of education 83
Table 3.4 Measurement items of responsiveness in education field 84
Table 3.5 Measurement items of assurance in the field of education 85
Table 3.6 Measurement items of empathy in service field 86
Table 4.1 Frequency analysis of demographic variables 91
Table 4.2 Reliability analysis of tangibles 93
Table 4.3 Reliability analysis of reliability 95
Table 4.4 Reliability analysis of responsiveness 96
Table 4.5 Reliability analysis of assurance 97
Table 4.6 Reliability analysis of empathy 98
Table 4.7 Reliability analysis of inter-participation 99
Table 4.8 Reliability analysis of student satisfaction 99
Table 4.9 Reliability analysis of total scale 100
Table 4.10 KOM and Bartlett's test of sphericity 101
Table 4.11 Principal component analysis results 102
Table 4.12 Five dimensions of service quality difference 103
Table 4.13 Service quality difference under 25 indicators 103
Table 4.14 Correlation analysis results 105
Table 4.15 Benchmark regression results 109
Table 4.16 Regression result for mediating effect 112
Table 4.17 Regression result of moderating effect 117

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List of Figures

Figure 1.1 Research Technique and Route Design..... 15
Figure 1.2 Thesis Structure 17
Figure 3.1 Research Model 64
Figure 3.2 Research Hypotheses 68
Figure 3.3 Questionnaire Design..... 69

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Chapter 1: Introduction

This chapter first introduces the research background of this thesis, including the background of internationalization of higher education, the background of service quality management of education, the background of Chinese-foreign cooperation education quality, the background of student learning outcomes and Glasgow School of University of Electronic Science and Technology of China. Secondly, the research problem of this research is described, the research significance of this thesis is divided into theoretical significance and practical significance. And then, this chapter introduces the main content of this study, using the model to evaluate the service quality of Chinese-foreign cooperation in running schools, the use of indicators to measure the students' learning results, Chinese-foreign cooperation in running schools and study the relationship between perceived service quality and students' learning results. Finally, this chapter introduces the research framework of this thesis.

1.1 Research background

Internationalization is an important trend in the development of higher education in the world, which is recognized and highly valued by countries all over the world. Therefore, the internationalization of universities has become the inevitable direction of the development of universities. Chinese-foreign cooperation education plays an important role in internationalization of higher education.

As a key university in China, University of Electronic Science and Technology of China (UESTC) promotes the cultivation of international talents, and has established a number of Chinese-foreign cooperation programs at undergraduate, master and doctoral level with several universities, such as University of Glasgow in UK, McGill University in Canada, Royal Institute of Technology in Sweden and University Institute of Lisbon in Portugal.

1.1.1 Internationalization of higher education

Internationalization of higher education is an important trend in the global education field. With the continuous acceleration of globalization, more and more higher education institutions have realized that by cooperating and exchanging with foreign education institutions, they can jointly

improve their education and academic levels, meet the diverse needs of students and teachers, and enhance the international competitiveness of their schools.

The main purpose of the internationalization of higher education is to promote the development of international education and academic research. In this process, cross-border cooperation and exchange have become an important means. Higher education institutions carry out cooperation and exchange through ways such as student and teacher exchanges, joint education programs, and collaborative research, to achieve the sharing of knowledge and culture. Through this approach, students and teachers can study abroad and experience different cultures and educational models, broaden their international perspectives, and improve their language skills and international competitiveness. At the same time, higher education institutions can also introduce advanced educational models and teaching resources from abroad to improve their teaching and research levels. Through this cross-border cooperation, higher education institutions can better meet the diverse needs of students and teachers, and improve their education and academic levels.

In addition to cross-border cooperation and exchange, the internationalization of higher education is also reflected in diverse education models, learning and communication in multilingual environments, and global students and teachers. Diverse education models include online education, blended education, and practical education, which can better meet the different needs of students and teachers. Learning and communication in multilingual environments can promote cross-cultural communication and understanding, and improve the language and cross-cultural communication abilities of students and teachers. Global students and teachers provide higher education institutions with more diverse cultural and knowledge resources, promoting the improvement of teaching and research levels.

The internationalization of higher education is of great significance to students, teachers, and higher education institutions. For students, the internationalization of higher education provides them with a broader vision and more choices, allowing them to acquire more extensive knowledge and skills globally, and improve their international competitiveness and employment capabilities. For teachers, the internationalization of higher education provides them with more opportunities to participate in international education and academic research, broadening their research fields and international perspectives, and improving their teaching and research levels. For higher education institutions, the internationalization of higher education can improve their international influence and reputation, enhance their international cooperation and exchange capabilities, and promote the improvement of their teaching and research levels.

In summary, the internationalization of higher education is an irreversible trend. Higher education institutions should actively participate in the internationalization process, and through cross-border cooperation and exchange, diverse education models, learning and communication in multilingual environments, global students and teachers, and other means, achieve the improvement of education and academic levels, meet the diverse needs of students and teachers, and enhance the international competitiveness and influence of their schools.

1.1.2 Educational service quality management

Service quality management in the field of education refers to the comprehensive and systematic management and supervision of various services provided by educational institutions to ensure that their service quality meets certain standards and quality requirements. It includes service planning, service implementation, service monitoring, service evaluation, and other aspects. The establishment of a scientific and perfect evaluation system and quality standards, strengthening the supervision and control of service processes, obtaining timely feedback and suggestions from customers, and making targeted improvements and enhancements can improve the quality and efficiency of services, promote the development and competitiveness of enterprises. Service quality management is an important management tool for various enterprises and organizations, and is the key to improving customer satisfaction and loyalty.

As an important management work, service quality management in the field of education is not only related to students' satisfaction and development, but also related to the reputation and image of educational institutions.

Service quality management in the field of education includes curriculum planning, teaching implementation, teacher team construction, student service. Firstly, curriculum planning is an important part of service quality management in the field of education. Educational institutions should, according to the needs of students and society, formulate curricula and teaching plans that meet actual needs, so as to improve the teaching level and attractiveness. Secondly, teaching implementation is an important link of service quality management in the field of education. Educational institutions should establish standardized teaching management systems and processes, ensure the orderly progress of teaching activities, strengthen teaching quality monitoring and evaluation, and timely discover and solve the problems in teaching. Teaching staff construction is also a key link of service quality management in the field of education. Educational institutions should pay attention to the

construction and management of teachers, strengthen teacher training and evaluation, and improve teachers' teaching ability and professional quality. Finally, student service is an important part of service quality management in education field. Educational institutions should pay attention to the development of student services and provide all-round, multi-level and personalized services to meet the needs and expectations of students.

The service quality management in the field of education needs to establish a scientific and perfect evaluation system and quality standards to ensure the efficiency, transparency and sustainability of education services. At the same time, educational institutions should pay attention to the establishment and improvement of feedback mechanism, timely obtain the opinions and suggestions of students and teachers, and carry out targeted improvement and perfection, so as to continuously improve the service quality and satisfaction. Service quality management in the field of education is an important guarantee for the sustainable development of educational institutions and an effective way to improve teaching quality and students' satisfaction.

1.1.3 Chinese-Foreign cooperation education

Chinese-foreign cooperation in running schools means that foreign legal person organizations, individuals and relevant international organizations cooperate with Chinese educational institutions and other social organizations with the status of legal persons to establish educational institutions mainly targeted at Chinese citizens and conduct educational and teaching activities within the territory of China.

According to the provisions of the Ministry of Education, China and foreign countries may cooperate in the establishment of educational institutions at all levels and of various types; Chinese-foreign cooperatives-run schools must abide by Chinese laws and regulations, implement China's educational policies, meet the needs of China's educational development and the requirements for personnel training, ensure the quality of education, must not be profit-making, and must not harm the interests of the state or the public. The administrative department of education under The State Council shall be in charge of Chinese-foreign cooperation in running schools throughout the country. Chinese-foreign cooperation in running schools is a public welfare undertaking and an integral part of China's education. The state implements the principles of opening wider to the outside world, standardizing the running of the school, administering the school according to law and promoting development. The State encourages Chinese-foreign cooperation in running schools that introduce high-quality foreign educational

resources. The lawful rights and interests of Chinese-foreign cooperators and Chinese-foreign cooperatively-run schools shall be protected by Chinese law. Chinese-foreign cooperatively-run schools enjoy preferential policies prescribed by the state in accordance with law and independently carry out educational and teaching activities in accordance with law. Chinese-foreign cooperation in running schools must abide by Chinese laws, implement China's educational guidelines, conform to China's public morality and may not undermine China's state sovereignty, security and public interests. Chinese-foreign cooperation in running schools shall meet the needs of the development of China's educational cause, ensure the quality of education and teaching, and devote itself to training all kinds of talents for China's socialist construction. Chinese and foreign cooperators may jointly establish educational institutions at various levels and of various types. However, no institution may be established to provide compulsory education or provide education of a special nature such as military, police and political education. Foreign religious organizations, institutions, colleges and universities and clerical personnel may not engage in cooperatively running schools within the territory of China.

The main body of Chinese-foreign cooperation in running schools is Chinese and foreign educational institutions, and the targets are mainly Chinese citizens in China. Chinese-foreign cooperation in running schools is an important form of our educational undertakings and an important form of education opening to the outside world, which belongs to public welfare undertakings and enjoys the core of introducing foreign high-quality educational resources.

Chinese-foreign cooperation in running universities is a form of transnational education that serves global development, trains global citizens and leaders, and solves the problems and challenges facing all mankind. Since the 21st century, transnational education has developed vigorously, and China plays an important role in it. Among the QS Top 100 Chinese and foreign universities, a total of 34 have cooperated with China in running universities or projects, which have set up four independent legal institutions, 15 non-independent legal institutions and 63 cooperative programs with China.

By the end of 2022, there were nearly 2,300 Chinese-foreign cooperative educational institutions and programs at various levels approved and recorded by the Ministry of Education in more than 600 colleges and universities across China, including nearly 1,200 institutions and programs at or above undergraduate level. The cooperation partners involved nearly 40 countries and regions and more than 800 foreign colleges and universities. More than 200 majors in 11 disciplines, including science, engineering, agriculture, medicine, law and education are involved in the cooperation. Each year, Chinese-foreign cooperatively-run universities and programs enroll more than 150,000 students, 2 million graduates and more than

600,000 enrolled students, of whom more than 90 percent receive higher education. At present, Chinese-foreign cooperation in running universities has entered a new stage of high-level and exemplary development.

The cooperative partners of the undergraduate Chinese-foreign cooperative education programs of the first-class universities are western countries with developed higher education, including the United States, Britain, Australia, France, and Germany. The number of cooperative programs with the universities of the above five countries accounts for about 80% of the total undergraduate cooperative programs of the "double first-class" universities. Other countries and regions with a large number of cooperative university-running projects are mainly located in countries and regions with higher education levels in Europe, America and Asia, such as Ireland, Portugal, Canada and South Korea.

The service quality of Chinese-foreign cooperative education has a direct impact on students' learning results. By the end of 2020, Chinese-foreign cooperative education has covered more than a dozen disciplines and more than 250 majors, with more than 600,000 students and more than 2 million graduates, cultivating a batch of compound international talents. Obviously, Chinese-foreign cooperation in running schools has become an integral part of China's higher education. With more advanced education equipment, higher-quality teachers and other joint school-running modes and higher-quality educational resources, Chinese-foreign cooperative education enables students to significantly improve their English level and professional knowledge in a way much higher than other students. More importantly, Chinese-foreign cooperation in running schools can make students more independent and confident. High-quality education service can cultivate more high-quality talents. In terms of curriculum advantages, teachers, textbooks and curriculum are closely aligned with foreign educational resources, which is conducive to students' receiving Chinese and Western cultural education. In terms of language advantages, Chinese-foreign cooperatively run schools attach great importance to students' language quality and oral English training, adopt bilingual teaching mode, and improve students applied English level to a greater extent. In terms of employment advantages, graduates of Chinese-foreign cooperation in running schools, who are often favored by foreign-funded enterprises and Chinese-foreign joint ventures, are most commonly employed by foreign-funded enterprises, and enjoy increased employment opportunities. Generally speaking, high quality education service means high quality social talents.

With the continuous development of Chinese-foreign cooperation in running schools in China, the public has more stringent requirements on the quality of education services. The advantages of Chinese-foreign cooperation in running a school can be brought into full play

only by setting up a correct direction, striving to improve the quality of running a school and always centering on the central idea of talent training. In order to improve the quality of education service and cultivate more talents, we should give full play to our characteristics and integrate international high-quality resources, actively absorb foreign good experience in running schools, and promote the reform and innovation of running schools at home and abroad.

1.1.4 Glasgow School of University of Electronic Science and Technology of China

University of Electronic Science and Technology of China, referred to as "UESTC", is located in Chengdu, Sichuan Province. It is a key university under the direct administration of the Ministry of Education of the People's Republic of China. It is a multi-disciplinary, research-oriented national key university with electronic information science and technology as its core, engineering as its main focus, and coordinated development of science, engineering, management, liberal arts and medicine. By March 2022, the University has four campuses, namely Qingshuihe, Shahe, Jiulidi and Yongning, with a total floor area of 1.39 million square meters. It has 23 schools offering 65 undergraduate programs. There are 15 post-doctoral research stations, 19 doctorate programs in first-level disciplines, 31 master degree programs in first-level disciplines, 4 doctoral degree programs and 12 master degree programs. The university has over 3,800 faculty and staff, including over 2,500 teachers and 660 professors, as well as over 300 high-level talents such as academicians of the Chinese Academy of Sciences and the Chinese Academy of Engineering.

Founded in 1451, the University of Glasgow is one of the four oldest institutions of higher learning in the English-speaking world and is renowned for its pioneering achievements. The University of Glasgow is one of the founders of Universitas 21, an international university organization, and the initiator of the Russell Group, Britain's "Ivy League". It is ranked 54th in the QS World University Rankings. The University of Glasgow has cultivated a large number of famous figures who have made outstanding contributions to mankind, such as Adam Smith, the father of economics, Kelvin, the creator of the absolute temperature scale of thermodynamics, James Watt, the father of the industrial revolution, John Baird, the inventor of television, and so on. In addition, it has produced seven Nobel Prize winners.

The Glasgow School is a Chinese-foreign joint Education Institution of the University of Electronic Science and Technology of China. In February 2016, the cooperative institution between UESTC and the University of Glasgow was approved by the Ministry of Education of China, and its official English name is Glasgow College, UESTC. The College offers three

undergraduate programs: Electronic Information Engineering, Communication Engineering and Microelectronics Science and Engineering. It enrolls 540 students in China every year. All the professional education of the College of Glasgow runs through the advanced educational philosophy of the world's leading universities, and adopts the teaching syllabus and curriculum design of the University of Glasgow. Relying on the high-quality educational resources of the two schools, the school uses heuristic and research-based teaching mode to explore new ways to cultivate innovative and top-of-the-line applied technology talents, aiming at improving students' innovative thinking ability and cultivating outstanding talents in the world IT and engineering field with international vision and international competitiveness and a high sense of social responsibility. All the professional teaching of the college is integrated into the quality control system of Chinese higher education and UK higher education. The qualified graduates have obtained degrees from both the University of Electronic Science and Technology and the University of Glasgow. The tuition fee of Glasgow College is RMB 100,000 yuan (about 13,500 euros) per student per year.

1.2 Research problem and questions

All the world-famous universities are highly internationalized. There is no doubt that Chinese-foreign Cooperative Education Programs play a very important role in the internationalization of higher education.

The essence of Chinese-foreign cooperative education is the activities between students and Chinese and foreign staff, which can be considered as the process of providing educational services. As Chinese-foreign cooperative education plays more and more important role, the attributes of serving students become more obvious. Therefore, the core of the research is service quality and students' learning outcome. On the one hand, learning outcome reflects the level of perceived service quality. On the other hand, the important dimension of perceived service quality can be judged through the relationship between the two.

1.2.1 Research problem

With the development of internationalization of higher education, universities are facing more and more fierce competition, and Chinese-foreign cooperative education programs are striving to serve students and improve the quality of the programs. An important purpose of Chinese-foreign cooperation in running schools is to jointly cultivate outstanding students. Any university is committed to improving the perceived quality of its services. Chinese-foreign

cooperative education is a kind of educational service. However, the cooperative education in China lacks a comprehensive and systematic evaluation of student service, and the relationship between service quality and learning outcome has not been reflected. It is a difficult problem whether the quality of service will affect students' learning outcomes.

1.2.2 Research questions

1. How to understand and measure Chinese-foreign cooperative education service quality indicators?

2. How does the service quality of Chinese-foreign cooperative education affect students' learning outcomes?

3. What are the demographic characteristics of students in Chinese-foreign cooperative programs?

4. What role does student satisfaction play in students' perceived service quality and learning outcomes?

1.2.3 Research difficulties

Due to the large demand for data, it is difficult to distribute and recycle questionnaires. At the same time, it takes a lot of time and energy to interview participants in Chinese-foreign cooperative education projects, and the qualitative data obtained from the interview is highly subjective and may not be highly practical. Therefore, how to obtain a large number of survey results, comprehensive summary and objective analysis is a difficult point of this study.

Secondly, as the evaluation of educational service quality of Chinese-foreign cooperation in higher education remains a relatively new research point, how to design the questionnaire specifically and analyze the results of the survey, so as to improve and optimize the current management mode proves to be another difficulty.

1.3 Research significance

As an important means of cultivating high-level talents, the role and effect of Chinese-foreign cooperation in running schools are worth analyzing and studying. Improving the service quality and level of Chinese-foreign cooperative education is an important way for the long-term development of Chinese-foreign cooperative education. Therefore, it is of great significance to study the service quality evaluation of higher education. At the same time, students' academic

performance is a very important evaluation index in the education industry, so it is of theoretical and practical significance to study the relationship between the perceived service quality of students in Chinese-foreign cooperative schools and their learning results.

1.3.1 Theoretical significance

(1) It provides a theoretical basis for the sustainable development of Chinese-foreign cooperation in running schools.

With the expansion of China's international educational cooperation and exchange, Chinese-foreign cooperative education has made great progress in both quality and quantity. Quality construction has become an inevitable way for the development of cooperative education projects, and providing a high level of educational service quality has become a requirement for the development of colleges and universities. The annual education inspection and evaluation system of the government education department is generally used to confirm the education quality of a school by means of evaluation after several years of graduates are produced. The traditional management mode of post-inspection only plays a macro-control role of management with serious lag. This study uses SERVQUAL model to evaluate the service quality of Chinese-foreign cooperative education, which is helpful to measure the quality of education service in time. At the same time, students' learning results are quantified to explore the relationship between service quality of Chinese-foreign cooperative education and students' learning results. This study is beneficial to the sustainable development of Chinese-foreign cooperative education projects and provides a theoretical basis for the research and practice of cooperative education.

(2) It is beneficial to improve and deepen the theoretical research of Chinese-foreign cooperation in running schools in colleges and universities.

At present, the situation that the theoretical research on Chinese-foreign cooperation in running schools is "neither useful nor enough" has not been fundamentally changed. For example, there are few research results on how to support and guide the development of Chinese-foreign cooperation in running schools in higher education. This study aims to make a macro and systematic study of Chinese-foreign cooperative education in colleges and universities, trying to serve the quality evaluation of Chinese-foreign cooperative education, deepen the reform of higher education, optimize the quality of Chinese-foreign cooperation in running schools management, enhance theoretical exploration, and provide more and better theoretical reference opinions for the innovative development of Chinese-foreign cooperative

education in colleges and universities.

(3) Further broaden the application scope of SERVQUAL model.

On the basis of SERVQUAL model and combining with the characteristics of Chinese-foreign cooperative education, this study constructs a service quality evaluation model based on SERVQUAL model, and further broadens the application scope of SERVQUAL model, thus providing a new tool for quantitative analysis of service quality in Chinese-foreign cooperative education.

1.3.2 Practical significance

(1) Improve students' learning outcomes

Before participating in the cooperative education program, the students have certain expectations on the educational services provided by the cooperative education program. When they experience it in school, they will compare the actual educational service with the expected one. Therefore, the gap is inevitable, which is normal, but if the gap is large enough, the learning effect of students will be affected. The research in this thesis is helpful for providers to find out the problems existing in school service in time, so as to improve and adjust the service quality and help students improve their learning effect.

(2) Improve the international competitiveness of cooperative education

The SERVQUAL model is introduced into the practice of service quality evaluation of Chinese-foreign cooperation in running schools. The various dimensions and indicators of service quality of Chinese-foreign cooperation in running schools are quantified, which provides a measuring tool for colleges and universities to carry out service quality evaluation of Chinese-foreign cooperation in running schools and helps schools to find the advantages and disadvantages of education services more accurately and intuitively. According to the personalized needs of students, we should constantly improve or maintain services, help schools to establish a good image in the fierce competition in the education market, obtain more students, introduce foreign high-quality resources, and improve the international competitiveness of China's cooperative education projects.

(3) Cultivate more high-quality talents

Chinese-foreign cooperative education programs provide more choices to meet the diversified needs of Chinese people for education. Students do not need to go abroad to enjoy high-quality educational resources abroad, which reduces the educational risk and cost of overseas study. The development of Chinese-foreign cooperation in running schools aims to

introduce high-quality overseas educational resources, provide more educational choices for the people, improve the quality of higher education in China more directly, and accelerate the development process of internationalization of higher education in China. Cooperative education has trained more high-level talents for China, which is conducive to the development and progress of the country.

1.4 Research method

This study comprehensively utilizes relevant knowledge of management and pedagogy, and adopts qualitative and quantitative methods to analyze the impact of perceived quality of Chinese-foreign cooperative education services on students' learning outcomes. Specifically, this study adopts the following three methods.

1.4.1 Literature research method

By reading and analyzing a large number of documents, this study sorts out the related studies such as "Chinese-foreign cooperative education", "education service quality", "SERVQUAL Model", "learning outcome evaluation", "Chinese-foreign cooperative education service quality and student learning outcome", understands the relevant theoretical basis, finds the evaluation dimensions and corresponding indicators of perceived quality of Chinese-foreign cooperative education services, and finds the evaluation indicators of learning outcomes, which lays a foundation for analyzing the relationship between Chinese-foreign cooperative education and students' learning outcomes. We draw lessons from the existing research to foster strengths and avoid weaknesses and provide support for the data analysis part of this study, which is conducive to the smooth completion of it.

1.4.2 Model study method

To analyze a phenomenon and derive a conclusion with the help of an existing model or models is called pattern analysis in the field of social science, which is used in this study. In this study, SERVQUAL model was introduced into the field of service quality in Chinese-foreign cooperative education. Based on the characteristics of the service quality of Chinese-foreign cooperative education, we modify the dimensions and corresponding indicators of the SERVQUAL model appropriately, thus constructing a service perception quality evaluation model based on the SERVQUAL model. The qualitative variable of perceived quality of

education service is quantified. It provides scientific basis for the evaluation of service quality of Chinese-foreign cooperative education, makes the correlation between perceived service quality of Chinese-foreign cooperative education and students' learning outcomes clearer, and makes the conclusion of this thesis more authentic and reliable.

1.4.3 Questionnaire survey method

In this study, a SERVQUAL model-based service perception quality questionnaire was designed from multiple dimensions, and the students of Chinese-foreign cooperative education projects were selected as the survey objects and sent questionnaires to them. The questionnaire was collected, the answers were analyzed and sorted out, the questionnaire information was deeply mined, and the quantitative evaluation of the service quality of Chinese-foreign cooperative education was obtained. At the same time, GPA information of students was obtained in the questionnaire survey, and GPA was used as the measurement index of students' learning effect. Through the questionnaire survey, we obtained quantitative and qualitative data, so as to analyze the survey results and lay the foundation for the follow-up research.

1.4.4 Empirical research method

After obtaining the data of service quality and learning achievement of Chinese-foreign cooperative education, we use SPSS data analysis software to make regression analysis on the relationship between perceived service quality and learning achievement of Chinese-foreign cooperative education. The main conclusions of this thesis are drawn and some problems that should be paid attention to in Chinese-foreign joint educational programs are put forward.

1.4.5 Research technology route

According to the background of internationalization of higher education, this study puts forward the importance of studying the relationship between service quality and students' academic performance in Chinese-foreign cooperative schools. In view of the current situation of Chinese-foreign cooperation in running schools in China, the SERVQUAL model was established to evaluate the perceived service quality of Chinese-foreign cooperation in running schools by selecting the indicators suitable for measuring the service quality of Chinese-foreign cooperation in running schools through extensive reading of domestic and foreign literature. According to the model, the questionnaire was designed， and distributed to the participants of Chinese-foreign cooperation in running a school. After the collection, the results of the

questionnaire are analyzed, and the quantitative data of the service quality of Chinese-foreign cooperative education is obtained through the survey results. GPA is used to measure students' learning results and empirical regression analysis method is used to study the relationship between perceived service quality and students' learning results. By analyzing the regression results, the main conclusions of this thesis are drawn. Based on the conclusions and the actual situation, suggestions are put forward for relevant departments, which can provide reference for promoting the sound development of Chinese-foreign cooperation in running schools and improving the international competitiveness of Chinese higher education.

The specific research technology route shown in the figure 1.1.

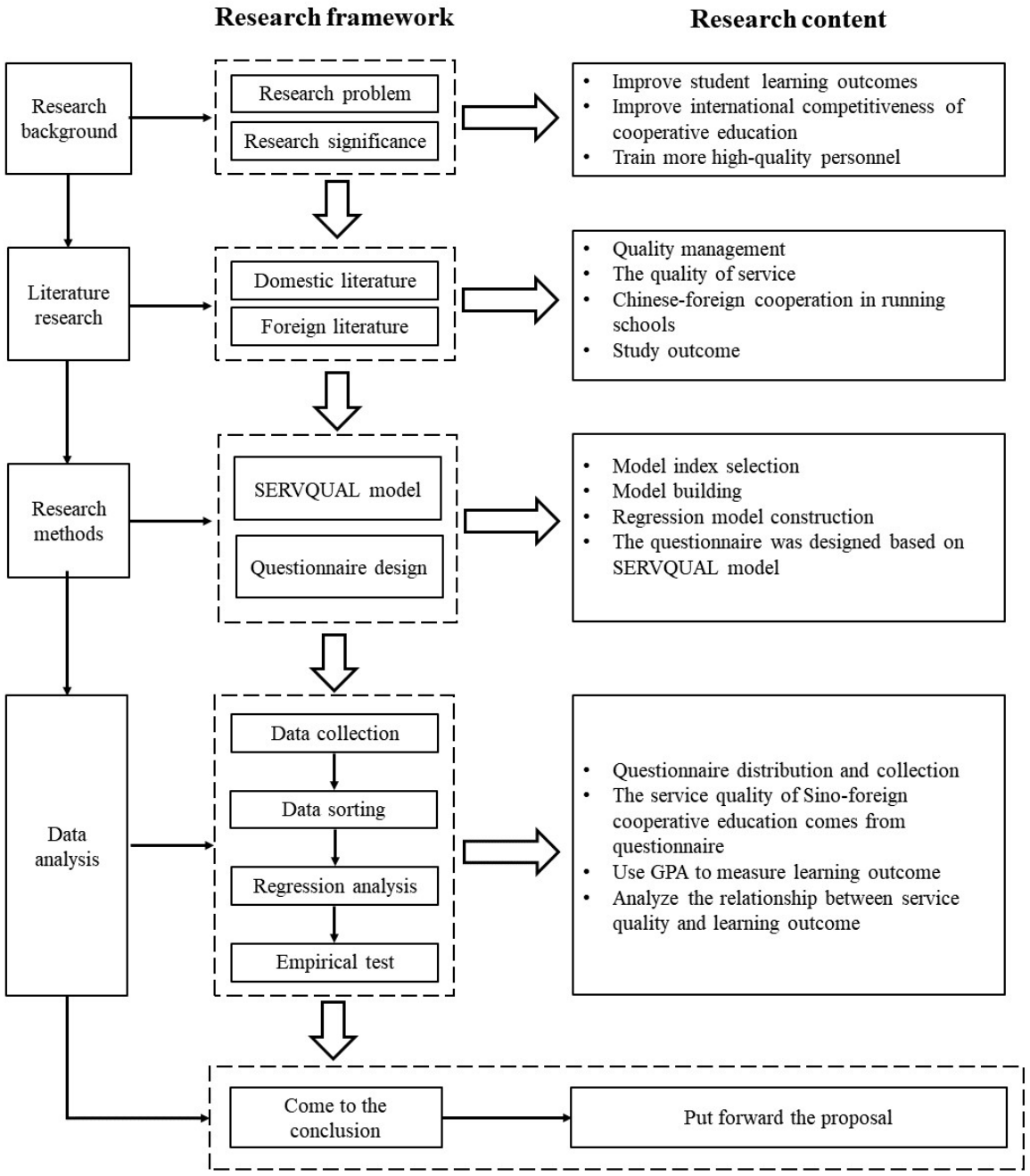


Figure 1.1 Research Technique and Route Design

1.5 Research structure

Focusing on the relationship between perceived quality of Chinese-foreign cooperative education services and students' learning results, this thesis mainly studies the following key issues.

(1) On the basis of literature survey, the development of Chinese-foreign cooperative

education in the field of Higher education in China, the evaluation methods of cooperative education quality, and the current situation of cooperative education management are analyzed and summarized.

(2) By referring to service quality evaluation method in industry and commerce, the factors affecting service quality in Chinese-foreign cooperative schools are analyzed, specific indicators suitable for education service evaluation are sought, and a SERVQUAL model for service quality evaluation in Chinese-foreign cooperative schools is established.

(3) The evaluation model of service quality in Chinese-foreign cooperative education is applied to make and distribute questionnaires. We will interview all kinds of teachers, students and managers at all levels who participate in the teaching and management of cooperative education of Glasgow College, UESTC, and conduct surveys to students to understand the views and opinions of all kinds of participants on the service quality of cooperative education projects. To investigate students' satisfaction with the service quality of cooperative education and the overall quality of Chinese-foreign cooperative education service.

(4) Analysis of questionnaire survey results. The results of the questionnaire and interview are summarized and sorted out, and the results of the questionnaire survey are analyzed, and the evaluation results of the service quality of Chinese-foreign cooperative education are obtained.

(5) Collect relevant data on the learning results of Chinese-foreign cooperatively-run students, analyze the relationship between the service quality of Chinese-foreign cooperatively-run schools and the learning results of students, and prove the importance of service quality of Chinese-foreign cooperatively-run schools to improve the learning results of students.

According to the research content, this thesis adopts the method of combining theoretical research and empirical research to construct the framework of the thesis.

The research structure is shown in figure 1.2:

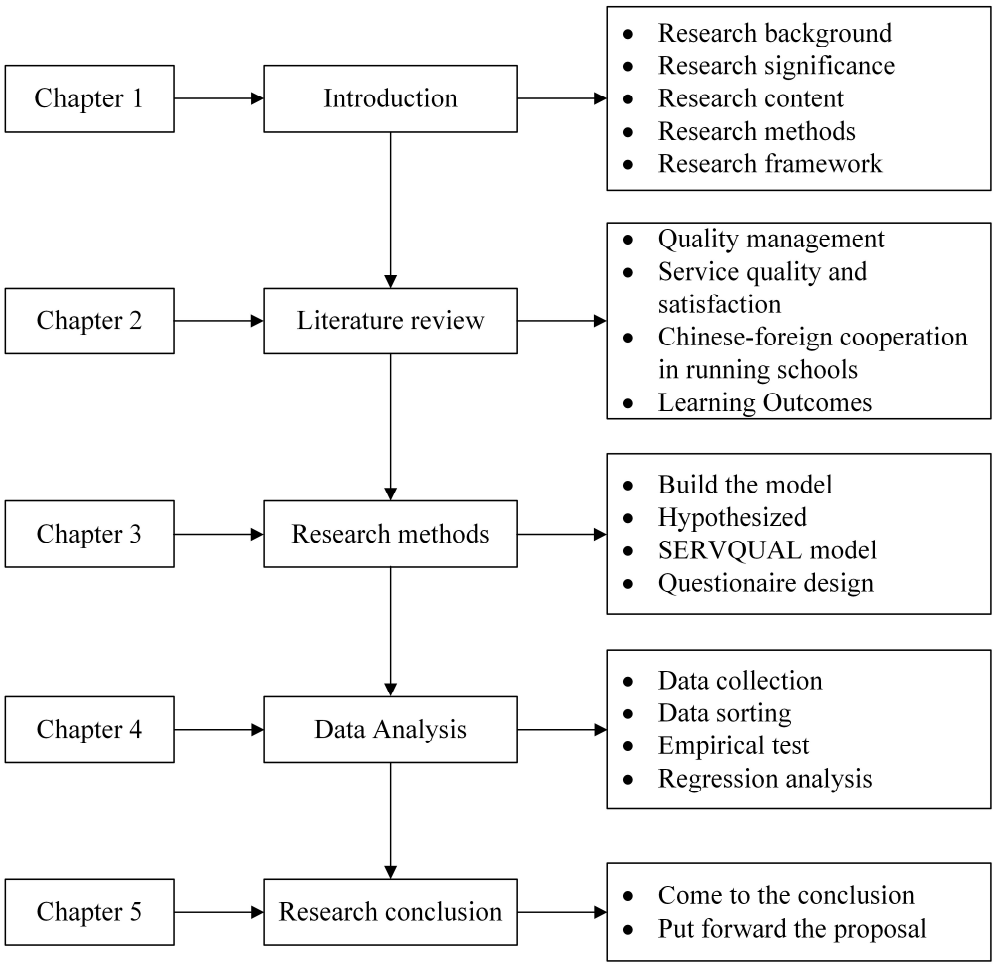


Figure 1.2 Thesis Structure

The thesis is divided into five chapters, and the content of each chapter is as follows:

Chapter 1: Introduction. This thesis introduces the research background, explains the current development status of Chinese-foreign cooperation in running schools, and the research status of influencing factors of students' learning results. Then, the significance of this research, including theoretical significance and practical significance, explains the value of this research. This part also introduces the research content of this thesis, including the main problems and difficulties of the research. Research problems explain the main problems solved in this thesis, research difficulties explain the difficulties encountered in the process of completing the research problems. At the same time, this part introduces the research method and structure of this thesis. The research method includes the finalize method and the quantitative method. The research structure part describes the main content of each chapter.

Chapter 2: Literature review. Extensively consult domestic and foreign literature related to

research issues, summarize literature on quality management, including theoretical research on quality management, empirical research on quality management, and total quality management. Review the literature on service quality, including service quality evaluation, service quality evaluation method, application of SERVQUAL model and service quality evaluation of higher education. At the same time, sum up the literatures Chinese-foreign cooperation in running schools. Including the motives of Chinese-foreign cooperation in running schools and significance of the development of Chinese-foreign cooperation in running schools, Chinese-foreign cooperation in running schools service quality evaluation, Chinese-foreign cooperation in running schools student's study effect research, Chinese-foreign cooperation in running schools learning achievement evaluation, Chinese-foreign cooperation in running schools analysis of the relationship between service quality and learning effect. Finally, chapter two is summarized to provide theoretical support for subsequent research.

Chapter 3: Research methods. Based on the literature review, this part puts forward the conjecture and hypotheses of this thesis, and puts forward the basic hypotheses that good service quality of Chinese-foreign cooperative education will help improve students' learning outcomes. To provide some support for the data analysis in the following part, we select the measurement indexes of students' learning results and the SERVQUAL model suitable for the evaluation of service quality of Chinese-foreign cooperative schools. This part elaborates the specific process of the study, including the index selection process and model construction process of the SERVQUAL model. Then, questionnaires are designed according to the model, and distributed to all kinds of participants in Chinese-foreign cooperative education and collected, laying a foundation for data analysis.

Chapter 4: Data analysis and statistics. By analyzing the results of the questionnaire, the index of service quality of Chinese-foreign cooperative education is obtained, and the index of student learning results is used. Empirical tests the relationship between the service quality of Chinese-foreign cooperative education and the learning results of students, the empirical results are analyzed and the main conclusions of this thesis are drawn.

Chapter 5: Research conclusions, limitations and prospects. This chapter summarizes the whole thesis, draws research conclusions, and puts forward relevant suggestions on service quality improvement of Chinese-foreign cooperative education based on the research conclusions. The limitations and future research directions are pointed out.

Chapter 2: Literature Review

This chapter is the literature review of the study, which summarizes the theories of quality management, service quality, service satisfaction and learning achievement, as well as the theoretical and empirical research in the fields of Chinese-foreign cooperation in running schools. The development trends and main issues of study on related fields are also clarified in this chapter.

2.1 Quality management

Quality management refers to all activities of a managerial nature in order to achieve quality objectives, ensuring that customer requirements are met at each stage, both internal and external, throughout the business process (Oakland et al., 2020). Quality management first appeared in private enterprises, and the object of management initially targeted at tangible products produced by enterprises. For enterprises, quality management refers to various management measures and plans taken by enterprises to improve quality, reduce costs and increase productivity, with the ultimate goal of improving the overall performance of enterprises and enhancing their competitiveness (G. J. Yu et al., 2020). The theory of total quality control (TQC) in the 1950s prompted enterprises to really look at quality problems from the perspective of management, and product quality management gradually developed from quality control and inspection to TQM. In the 1980s, the western new public management movement was launched, and the concept of quality management was introduced into the field of public organization management. Commercial means are gradually popularized in the public sector, and quality management means such as business planning, marketing and performance management are also increasingly accepted by public service managers.

2.1.1 Quality management theory

At the early stage of the development of quality management theory, Juran (1986) believed that the customer-centered principle in quality management encourages enterprises to constantly acquire new demands and expectations of customers, so as to guide enterprises to carry out continuous product innovation to respond to and meet the ever-changing needs of

customers.Crosby (1979), Juran (1981), Deming (1986), Garvin (1987) and other pioneers of quality management conducted research based on their own experience and practice, and presented their own views on the key to the implementation of quality management. Although the specific content and expression are slightly different, they all involve the crucial links of quality management activities, including: the support of leaders, the role of quality department, employee relations, quality training, supplier management, product or service design, process management, quality data and reports. In this context, Prajogo and Sohal (2003) believed that quality management practices not only have a significant impact on product quality, but also on product innovation. Similarly, the quality performance of enterprises also has a significant positive effect on innovation performance. Khan and Naeem (2018) studied the relationship between quality management and service innovation as well as organizational performance according to the classification of hard and soft quality management practices. The results show that hard practice mediates the positive relationship between soft quality management practices and service innovation. At the same time, quality management practices indirectly exert positive effects on organizational performance by influencing service innovation. After dividing quality management practices into organic practices and core practices, Prajogo and Sohal (2004) studied the differences in the impact of different quality management practices on product innovation. The results showed that organic quality practices, including leadership commitment, personnel management and customer attention, had a positive effect on innovation, and core practices such as strategic planning, quality information, and analysis had a significant effect on quality performance, but not on innovation. At present, the academic circle has accumulated a large number of research on the positive influence of quality management practices on enterprise performance in different aspects and to different degrees. Dow et al. (1999) studied the positive impact of quality management practices, especially employee commitment, shared vision and customer orientation on quality performance. The empirical study of Maiga and Jacobs (2005) found that quality performance played a mediating role in the positive relationship among the quality control system, financial performance and customer satisfaction. The research conducted by Parvadavardini et al. (2015) on Indian manufacturing enterprises verified that quality management practices have a significant positive impact on quality performance, and thus on enterprise performance. Pinho (2008) reached a similar conclusion after studying small and medium-sized enterprises and found that the quality assurance system and management practices can have a positive impact on both financial and non-financial performance of enterprises. The study of Japanese manufacturing enterprises showed that quality management practices have a significant positive effect on the competitive performance

of enterprises (Phan et al., 2011).

2.1.2 Empirical study on quality management

In the empirical studies related to quality management, the concept of quality management is mostly in the form of quality management practices. Because the conceptual level of quality management is relatively abstract, while the technical or methodological level is too scattered with fast updated speed, empirical research generally chooses the practical level that is more concrete and easy to generalize (Galkina & Sorokin, 2020). As early as 1995, Badri et al. (1995) put forward the concept of quality management practice according to the existing relevant theories, constructed the measurement model of eight key elements and conducted empirical tests, which further laid a theoretical basis for subsequent studies. Later, Dow et al. (1999), Kaynak (2003) and many other scholars began to pay attention to the measurement of quality management and discussed the elements of quality management practice. The previous dimensions were slightly adjusted, refined or expanded based on different data and research environments (Phan et al., 2011). The empirical research of Martínez-Costa and Martínez-Lorente (2008) supported the significant positive impact of quality management on organizational innovation performance. The empirical study of Satish and Srinivasan (2010) showed that there is a positive relationship between quality management and various types of innovation performance, including product innovation, process innovation, system innovation and management innovation, which cannot be ignored. Kim et al. (2012) also divided innovation into breakthrough, incremental, product innovation, process innovation, management innovation and other categories, and verified that quality management practices have a significant positive impact on innovation in all categories. According to the empirical study of Khan and Naeem (2018), the positive impact of quality management practices on innovation performance mainly focused on process management, strategic planning, personnel management and customer attention.

2.1.3 Total quality management

With the rise of the concept and theory of Total Quality Management (TQM) and the popularity of quality awards around the world, the market attaches more importance to quality, which boosts the academic attention to the research in the field of quality management. The emerging quality management theory and quality award standard have injected fresh blood into the connotation definition and composition scope of quality management practice. Calvo-Mora et

al. (2005) used the rules of the European Foundation for Quality Management (EFQM) for reference to measure Quality Management practices and conduct empirical research. Some scholars combined MBNQA and EFQM standards to form the measurement of quality management.

Total Quality Management (TQM) is widely used in the process of improving competitiveness in the world. It is one of the management systems that sees quality as an important business strategy, takes consumer satisfaction as the orientation and organizes all members to participate. TQM improvement involves all organizational functions, including the strategic, marketing, and human aspects of the organization. One way to deal with these aspects is to use Deming, which focuses more on improving the internal quality of a company (Oakland et al., 2020). Total quality management (TQM) is the application of quantitative methods and human resources to improve all processes within an organization and go beyond current and future customer needs. In addition, TQM is defined as a set of philosophies and guiding principles that represent the foundation of an organization for continuous improvement (Samson & Terziovski, 1999). After the widespread adoption of TQM, Japanese enterprises have become strong competitors in different industries such as automobiles and electronics. By actively adopting TQM, enterprises in developed countries have begun to cooperate with Japanese enterprises on quality. In addition to the complex performance impact in the relationship between TQM and corporate performance, the focus of TQM research has also shifted to understanding the mitigating factors that strengthen or weaken the relationship (Kaynak, 2003). Scholars have proposed four types of mitigating factors: national context and culture, firm size, strategic context and other organizational context (Toke & Kalpande, 2021).

TQM has been recognized as a method that can provide a competitive advantage (Easton & Jarrell, 1998). The reasons for the relationship between TQM and competitive advantage are twofold. Diversified TQM process components, such as top management support, training programs, and management's quality management philosophy, provide an environment for employees to effectively implement TQM, which helps companies use their human and other resources more efficiently. In addition, companies that adopt TQM tend to have a reasonable organizational structure. Such companies identify customer needs and try to differentiate products and processes to meet those needs. This market-driven capability helps the company outperform its competitors (Yeung et al., 2006).

In general, the introduction of the quality management system has produced the following results: (1) improved products; (2) establish an operational mechanism for continuous improvement of the process adopted; (3) optimize the management system of the enterprise and

its branches; (4) use labor force more efficiently; (5) improve staff discipline and responsibility; (6) more systematic and efficient working practices. (7) focus resources on meeting customer needs and expectations.

2.2 Service quality

With the market paying more and more attention to the service industry in recent years, more and more researches have begun to explore the relationship between quality management practices and enterprise performance specifically for the service industry. C. Wang et al. (2012) verified that quality management practices can positively influence the customer performance and financial performance of the hotel industry. Talib et al. (2013) analyzed the survey data of Indian service enterprises and believed that culture-related factors in enterprise quality management practice had the most significant impact on quality performance. Al-Hawary and Abu-Laimon (2013) conducted a regression analysis on banking data and found that quality management practices had a significant positive effect on both financial and non-financial performance of the bank. Basu et al. (2016) studied the information technology-based services of small and medium-sized enterprises and found that different dimensions of service quality management practices would have a direct or indirect positive impact on the quality performance and operation performance of enterprises. Xiong et al. (2017) studied the quality management activities of hospitals and found that quality management practices, especially employee relations and process management, would significantly affect hospital performance, including the performance directly related to medical process and the performance unrelated to medical care, such as satisfaction and financial performance. In addition to these examples, in recent years, the research related to service quality management practice has also been widely involved in insurance, retail, tourism, education, especially higher education, including Chinese-foreign cooperation in running school projects and other various services. Most studies have confirmed that the quality of service has a different positive impact on corporate performance. With the increasingly complex market environment and ever-changing customer needs, service quality has gradually become the strategic focus of each organization to obtain competitive advantages. The quality of products and services is essential to the success of an organization.

2.2.1 Evaluation of service quality

In the 1970s, scholars began to study service quality. In the early 1970s, service quality was

defined as whether the service could meet the preset standards. However, service quality is fundamentally different from product quality. The intangible, perishable and indivisible characteristics of service determine that service quality is based on the subjective judgment of customer perception, which inevitably presents certain subjectivity, difference, process and dependence. As time goes by, quality management continues to transcend boundaries, and then covers the service field rather than just products. In 1972, Levitt referred to the traditional definition of product quality and defined service quality as the degree to which the service result can meet the set standard. Later, more scholars combined the characteristics of service quality and began to explain and study service quality from the perspective of consumers. For example, Gronroos (1993) believed that service quality depends to a large extent on the subjective perception of customers, so it is not universal to quantitatively evaluate service quality simply as an entity. Deng (2009) believed that service quality refers to the degree to which the inherent service characteristics meet the requirements. Service quality characteristics can be quantitative (measurable) or qualitative (comparable), which depends on how the service quality is evaluated and, on the subject (i.e., the customer) who implements the evaluation. Therefore, in most studies, the evaluation of service quality is based on the subjective perception of service objects. Kassim and Abdullah (2010) was the first scholar to apply quality to service. In his opinion, service quality refers to the service experience that customers enjoy and their evaluation of such experience. In this way, a result can be obtained in a quantitative form, which is later called service quality. Subsequently, Gronroos conducted in-depth research on this theory and expanded it in his research theory. He believed that service quality can be evaluated from three specific aspects, including corporate image, service quality provided by enterprises for consumers and the whole service process. Enterprise's external image is the evaluation of the first impression of consumers' opinions; service quality evaluation is the evaluation of the services provided by the enterprises; the service process refers to the process that consumers enjoy the experience and services provided by enterprises; what attributes consumers make is directly related to the evaluation process, which is the most important link. Parasuraman et al. (1985) proposed in his theory that service quality is affected by many factors, among which the following three are the most important: customer's expectation of the service, experience process and customer feedback information. Similarly, in the research process, they also found that the customer experience process determines the level of the service quality, and the customer's expectations and final feedback will change align with each other

Akan (1995) comprehensively considered the existing viewpoints and proposed that service quality refers to the quality of results and processes. This requires enterprises to invest more

energy to improve consumer service experience and consumer satisfaction in the process of experience in order to obtain good result quality. Mukesh et al. (2009) also summarized the previous research theories and proposed that service quality is affected by several factors such as products, environment and information provided by enterprises. They established a complete set of analysis models to find the relationship between these factors of service quality. Generally speaking, service quality evaluation refers to the process of objectively evaluating and measuring the service quality by using specified tools and methods in accordance with certain standards and rules. Service quality involves a series of elements that interact and depend on each other to form the whole service quality.

2.2.2 Service quality evaluation method

Service quality is a difficult concept to measure. At present, the evaluation methods in academic circles mainly include questionnaire, side evaluation and mathematical statistics (Ju & Chen, 2017). Questionnaire method is a way to know the perception of service quality by issuing questionnaires to customers. The side evaluation method selects various indicators from other perspectives to understand the customer perceived service quality from the side, but this method tends to have a low accuracy. Mathematical statistics method is mainly to carry on the corresponding analysis to the data.

Specifically, with regard to the questionnaire method, G. Zhu et al. (2003) used the service quality gap theory to investigate the educational service quality of Zhejiang Communications Vocational and Technical College in the way of questionnaire survey, and measured the difference value of students' expectation and perception of education service of Zhejiang Communications Vocational and Technical College. H. Xi and Kang (2016) conducted a questionnaire survey and an interview with tourists. The opinions of tourists on the construction of scenic spots, food, clothing, accommodation and travel services of travel agencies were collected, and the service quality was objectively evaluated. In the aspect of side evaluation, a large number of studies use customer satisfaction to measure service quality. W. Yang (2013) studied the three levels of service quality and the five levels of customer satisfaction through canonical correlation analysis, and believed that the better customers' cognition of the three levels of service quality, the higher customer satisfaction. Dong (2012) confirmed that customer satisfaction has a significant positive impact on the three dimensions of service quality reliability, empathy and tangibles through the study on the beauty and hair industry, among which empathy has the greatest impact. In terms of mathematical statistics, J. Liu and Ma (2014)

established a service quality evaluation system by using principal component analysis method and structural equation model based on four hidden variables: identification system, maintenance support, basic conditions and service environment. R. Xu and Wang (2016) adopted the structural equation model and proposed the service quality evaluation model from the perspective of employees' vision, and constructed the structural equation model with five latent variables and 25 measurement questions. Q. Lv (2015) established a service quality evaluation model based on tourists' perception and conducted empirical verification of the research results. X. Wang and Li (2019) used entropy weight method and fuzzy comprehensive evaluation method to build a service quality evaluation model composed of twelve indicators. Of course, there are also studies combining questionnaires and empirical methods. For example, X. Sun (2017) constructed the PDCA model of customer satisfaction analysis, carried out a series of questionnaire surveys, analyzed them with factor analysis method, and obtained the six major factors affecting satisfaction. Finally, she evaluated the service quality from the side.

At present, most of the research on service quality has evaluated service quality from qualitative and quantitative perspectives, and some research has combined qualitative and quantitative methods to construct the evaluation system. The available evaluation models mainly include SERVQUAL model, SERVPERF model, CUSTOMER satisfaction index (CSI) model and IPA important performance analysis model, as well as the evaluation system independently established by researchers. Among them, the most widely used method is the SERVQUAL of PZB. Cronin and Taylor (1992b) believed that consumers would not have any expectation for service quality if they neither buy a certain product or service nor know what kinds of service the enterprise could provide. Therefore, when evaluating service quality, there is no need to refer to consumers' expectation, but to analyze them directly from the process of consumers' purchasing experience. They established the famous SERVPERF model, which also set 22 specific questions from five different dimensions to understand consumers' evaluation of experience service. Beimborn and Joachim (2011) pointed out in their research theory that there is a very serious problem in the previous theories of service quality evaluation. That is, the relationship between consumer expectation and perception was neglected, which may influence each other and lead to the deviation of results. They established the famous NDSERVOUL model to measure the gap between consumers' expectation and perception. In this way, enterprises can obtain survey results more accurately and ensure the connection between survey results and objective reality. After extensive application, it is believed that Brown's NDSERVOUL model is more practical.

In short, the research and application of evaluation methods for service quality have been

quite mature at present.

2.2.3 SERVQUAL model application

SERVQUAL model is based on five dimensions proposed by Parasuraman, Zeithaml and Berry (PZB), including reliability, responsiveness, assurance, empathy, and tangibles of service quality. According to the model, customers evaluate the service from these five dimensions and get the cognition of service quality through the comparison between perception and expectation (X. Chen et al., 2016). SERVQUAL model has a wide range of applications. It can not only be used to evaluate the service quality of all walks of life, but also to evaluate the teaching quality of colleges and universities. It can also be used in school management and other fields related to student education management.

In terms of hotel, catering and tourism, Goranczewski and Puciato (2011) used the SERVQUAL questionnaire to evaluate hotel service quality and verified that the SERVQUAL questionnaire is effective to evaluate the service quality of a hotel. Keshavarz and Jamshidi (2018) discussed the relationship between service quality evaluation and customer satisfaction with the hotel through service quality evaluation of the hotel. Beheshtinia et al. (2019) proposed a mixed model based on HOQ, SERVQUAL and Kano models to meet the needs of customers in order to improve customer satisfaction of hotels. The SERVQUAL model is applied to rural tourism, J. Xu (2012) reconstructed the specific indicators contained in the five dimensions of the SERVQUAL scale according to the composition of the service quality of travel agencies. Taking large travel agencies in Guilin City as an example, Pu (2017) qualitatively analyzed the service quality problems of travel agencies by using the service quality gap model. On the basis of model evolution, he referred to the SERVQUAL theoretical model and combined with the service characteristics of travel agencies, and obtained the quantitative survey results. Yan and Zhao (2016) built a rural service quality evaluation model based on the SERVPERF evaluation model. They divided the evaluation levels so as to judge the service level, find out the service shortcomings and put forward the corresponding improvement measures.

In the financial industry, Al-Tamimi and Al-Amiri (2003) used the SERVQUAL model to analyze the service quality of the Islamic Bank of the United Arab Emirates, and compared the service quality of Dubai Islamic Bank and Abu Dhabi Islamic Bank. Y. Wu et al. (2011) reviewed and summarized the methods, service quality dimensions, suggestions and limitations of seven e-banking service quality studies conducted in seven countries (regions). Through empirical research, cultural factors are added to the SERVQUAL scale to construct a

measurement model of online banking service quality, and the first robust and comprehensive service quality evaluation system of Taiwan e-banking is put forward. In terms of exhibition service, H. Zhang (2014), from the perspective of professional audience and based on SERVQUAL model, established an evaluation system for the on-site service quality of the exhibition industry according to the characteristics of the exhibition industry, and evaluated the on-site service quality of the Canton Fair. Other scholars have also studied the application of SERVQUAL model in different industries. For example, B. Li (2017) summarized and discussed the application of SERVQUAL model in medical treatment, nursing and elderly care in China. S. Yi et al. (2017) reviewed the literature research on the service quality of e-commerce platforms and discussed the improvement direction of the evaluation model based on SERVQUAL.

2.2.4 Evaluation of service quality of higher education

Ma (2009) defined higher education service as "the service that higher education institutions provide to educates with tangible equipment and professional skills to improve their professional level and comprehensive quality and promote the value-added of their human capital". This view is also widely accepted by the academic community. Evaluation is an activity of value judgment, and it is a judgment of the degree to which the object meets the subject's needs (J. Liu & Wang, 2004). In the process of evaluating the service quality of Chinese-foreign cooperation in running schools, the main body of the evaluation is the students who benefit directly, and the object of the evaluation is the process and effect of teaching service provided. The evaluation methods vary according to the different evaluation purposes, while the satisfaction of the students remains to be the main index of the service quality evaluation of Chinese-foreign cooperation in running schools. At present, the service quality evaluation models of higher education are mostly based on the "service quality" evaluation model of management. Specifically speaking, a model of evaluating the service quality of Chinese-foreign cooperation in running schools is created with the combination of "service quality" model and 22 projects and characteristics of Chinese-foreign cooperation in running schools. It is mainly divided into two models. The first one is SERVPERF model, which takes performance factors into consideration and defines service quality as the performance perceived by customers. It focuses on customers' perception of service quality after receiving service and pays attention to customers' direct experience (Gong, 2011). The second is the SERVQUAL model. The model of service quality can be divided into five dimensions, each of which is

subdivided into a number of problems. Users are allowed to talk about their expectations of every problem, real feelings of value and the minimum acceptable rate first. Then 22 specific factors were established to calculate the score. At last, the customers' evaluation of service quality was obtained. In other words, it is to evaluate the reading service quality from the customer's expectation level. In recent years, the five scales of the model have been used as theoretical concepts, and the original 22 projects can be converted and flexibly applied in various disciplines. Therefore, SERVQUAL model has incomparable advantages over other methods in service quality evaluation of Chinese-foreign cooperation in running schools, especially in higher education. Therefore, this study will also use this model to evaluate the service quality of Chinese-foreign cooperation in running schools (W. Xu et al., 2014).

In the field of higher education, Emanuel and Adams (2006) used the revised SERVQUAL model to measure students' satisfaction with teachers' teaching services in an American university. J. Gu (2006) made an empirical analysis by taking Peking University as an example. Based on SERVQUAL model, a higher education service quality measurement tool has been developed with good reliability and validity. At the same time, the overall gap analysis table and the university service quality scan chart have been developed as the basic tools for higher education service management.

In today's increasingly competitive environment, it is very important to understand the needs and expectations of college education consumers. SERVQUAL model provides college administrators with the customer expectations needed in college management decision-making, which is beyond the competence of other service quality evaluation models.

2.3 Service quality and satisfaction

Academic disputes and disagreements revolve around the relationship between the composition of service quality and customer satisfaction. In fact, the relationship stems from two different research theories, using perception and expectation as antecedent structures. Some scholars believe that service quality is the result of service, and customer satisfaction is the prior expectation and feedback of service quality (Oliver, 1980). A large number of researchers hold the view that customer satisfaction and service quality are mutually independent yet share some of the same elements (Parasuraman et al., 1988).Some scholars believe that there is no difference between these two concepts. A large number of literature shows that the research of customer satisfaction is carried out by evaluating the service quality(Cronin & Taylor, 1992a). Many organizations have realized the interchange of customer satisfaction and service quality

when evaluating service quality. When evaluating quality, enterprises think that there is no difference between customer satisfaction and service quality(Cronin & Taylor, 1992a). Satisfaction model often focuses on comparing customer's expectation with the service used, which is called service quality gap(Parasuraman et al., 1988). Perceived service quality is established between expected occurrence and actual service. Boulding et al. (1993) provided a model and proposed the cumulative effect of customer satisfaction. The model assumes that customers make comparative judgments every time they enjoy the service. Experience has proved that customers' perception and satisfaction of service quality directly affect their evaluation of enterprises. Zeithaml (2000) expanded this research and found that the positive effect of customers on enterprises can be reflected by the positive word-of-mouth spread, the re-visit, the increase of purchase quantity, and the willingness to pay high prices for the products and services of enterprises. These results will lead to an increase in customer loyalty and revenue.

Service quality is a prerequisite for establishing and maintaining a satisfactory relationship with customers. The relationship between service quality and customer satisfaction has become a strategic topic(Cronin & Taylor, 1992a). On the whole, perceived service quality is the premise of satisfaction(Spreng & Mackoy, 1996). Therefore, proper understanding and customer satisfaction are of vital importance in a competitive environment (Lassar et al., 2000). Bigné et al. (2003) found that there was a significant relationship between service quality and satisfaction. Ham (2003) believed that there is a positive correlation between perceived service quality and student satisfaction in colleges and universities. Actually, there is a relationship between perceived service quality and satisfaction analysis in research. Elliott and Shin (2002) found that there was a high correlation between the model of customer satisfaction and university performance.

Arambewela and Hall (2009) showed in their research report that service quality can help enterprises attract new customers, and customer satisfaction can be ensured by maintaining the existing service quality. Therefore, the most important responsibility of higher education institutions is to improve all aspects of services, improve perceived service quality and improve student satisfaction. Helgesen and Nesset (2007) said that one of the most important factors affecting students' satisfaction is their positive perception of service quality. Satisfied students can use positive word of mouth to inform their friends and thus attract new students. In addition, positive word of mouth leads former students to stay and pursue other courses at the university. On the other hand, Russell (2005) revealed that an important goal of higher education institutions is to provide services to students. This approach may generate a lot of extra revenue

for educational institutions. Oldfield and Baron (2000) believed that in order to provide high-quality services and meet students' needs, higher education institutions must focus on students' actual needs, instead of providing service quality for students according to the requirements of university. According to Ong (2013) research, when discussing the question of what are the consequences of students' dissatisfaction, the importance of college students' satisfaction is shown. University presidents must be aware that dissatisfied students tend to drop out or transfer. Even if dissatisfied students are forced to stay in university because of their failure to choose another university, they will lose their loyalty to the university and won't carry out positive word-of-mouth communication. Based on the research of Soutar and McNeil (1996), students' perceived service quality can be measured from two dimensions, including non-academic and academic dimensions. On the other hand, Athiyaman (1997) proposed other dimensions of students' perceived service quality, such as library, curriculum, leisure facilities, equipment level, academic staff and teaching quality. In addition, Hill (1995) proposed to measure students' perceived service quality from 14 aspects, including library facilities, travel agencies, housing services, employment services, university bookstores, consulting services, health services, financial aid, course content of students' participation, work experience and computing facilities. The author believes that the success and failure of college students are closely related to their satisfaction with the service quality of colleges and universities. Students believe that higher education quality can bring more learning opportunities (Aldridge & Rowley, 1998).

2.3.1 Student satisfaction

Student satisfaction refers to students' subjective appreciation of educational achievements and experience(Voss et al., 2007). Student satisfaction is linked to their campus experience. In addition, the campus environment seems to be an interconnected experience, which affects the overall satisfaction of students. Student performance in class is related to their experience in all other aspects of campus life.

Browne et al. (1998) found that students' overall satisfaction with a university is determined by the curriculum and other factors related to the curriculum of the university. The study concluded that students recommend their college to friends or relatives based on their experiences interacting with staff at the university.

Borden (1995) found that student satisfaction is related to the matching between students' priorities and campus environment. Classroom research also found that student satisfaction may be related to how the classroom environment is arranged. The high correlation between the

actual classroom teaching environment and students' preferred classroom environment can strengthen students' emotions, such as satisfaction.

Sevier (1996) hold the view that the product of a university is greater than its academic courses, which is the sum of students' academic, social, physical and even spiritual experiences. Colleges and universities generally focus on the student's educational experience, namely the student-teacher ratio, quality plans and teacher credentials. However, students may view education from different value dimensions. A university may emphasize academic and spiritual experience, while students may evaluate it in terms of the social experience available on campus.

Boyle (1987) showed that most students were satisfied with their academic courses, but less satisfied with support services, such as academic guidance and career counseling. Successful universities have realized that the best strategy is to provide good support services to retain students or attract new students.

Patterson et al. (1997) proved that there is a close relationship between customer satisfaction and students' re-visit. Babin and Griffin (1998) found that customers with high customer satisfaction have high patronage rate in the future. Therefore, it is logical to assume that students who are dissatisfied with their educational experience are reluctant to recommend this university to friends or relatives. For many universities, student satisfaction can be reflected through the evaluation.

Hameed and Amjad (2011) collected 157 students from the Institute of Information Technology and conducted a questionnaire survey on student satisfaction. They used a modified version of Trang et al. (2018) satisfaction model and found that staff, teachers and classes had a significant impact on students' satisfaction.

Aldridge and Rowley (1998) investigated a group of students in a British university and measured their satisfaction level. The results show that the quality gap model is helpful to manage this phenomenon. The model emphasizes that enterprises should thoroughly investigate the events that lead to students' dissatisfaction, otherwise, they would have persistent poor perceived quality. Similarly, Napoli and Wortman (1998) believed that life, self-esteem, social ability, social support, personal sense of responsibility, psychological well-being and academic satisfaction of universities, administration and social system have lasting influence on universities.

Hennig-Thurau et al. (2001) used the loyalty model relationship scale in German universities, and found that there is a crucial relationship between teaching quality and students' feelings towards universities. Y. T. Yu and Dean (2001) studied the relationship between positive emotions, negative emotions, cognitive satisfaction and students' loyalty.

Palacio et al. (2002) conducted a study on Spanish college students, and the results showed that the university image influenced the students' satisfaction with the university. The results of a study conducted by Mayo et al. (2004) showed that family conflicts/work demands, financial problems and academic problems are the factors that affect students satisfaction.

Aldemir and Gülcan (2004) studied student satisfaction in Turkish universities. The results showed that for some Turkish college students, teachers' quality, education level, teaching materials and gender, and admission notice are considered as important factors of satisfaction.

Marzo Navarro et al. (2005) investigated the satisfaction of Spanish college students with their college education. The results showed that teaching staff, teaching methods and course management are the key factors to achieve student satisfaction and loyalty.

Ruby (1998) studied student satisfaction and its influencing factors in higher education. It is found that the most favorable factors affecting student satisfaction are students' overall impression of the university, the overall impression of the quality of education, teachers' professional knowledge, their interest in research topics, the quality and accessibility of university facilities, their views on academic degrees, and students' career.

Similarly, DeShields et al. (2005) used satisfaction model and Herzberg's Motivation Two-Factor Theory to study the influencing factors of students' satisfaction. They found that teachers' performance and class are the key factors determining the quality of students' service, which leads to satisfaction. All these studies emphasized some specific factors of educational products, which determine students' satisfaction with education and their loyalty to the university.

Ahmed and Masud (2014) conducted a quantitative survey on the service quality of Malaysia's universities. Structural Equation Modeling (SEM) was used to study the key factors of service quality. Five factors that affect service quality were analyzed, namely, responsiveness, tangibles, empathy, assurance, and scientific research projects. The results showed that academic feedback and administrative service do not directly impact satisfaction, but there is a positive correlation between these two factors and satisfaction. Empathy (academic feedback and academic plan) has been found to have a strong indirect influence. On the other hand, tangible factors directly affect satisfaction. Similarly, the responsiveness of academic staff has a strong direct impact on satisfaction. Therefore, if graduate schools want to achieve higher student satisfaction, they must focus on solving students' personal problems, and administrators should pay more attention to students. In addition, the graduate school provides the latest equipment and physical facilities to improve academic feedback and academic plans. Finally, graduate schools should focus on the reaction of academic staff to ensure that academic staff are more active in communicating with students.

Scholars in China also have a lot of research on learning satisfaction. Cai (2006) investigated the satisfaction of college students' campus life, and found that, on the whole, college students were dissatisfied with campus life. Differences in gender, household registration and economic conditions of college students have no significant impact on campus life satisfaction, while family, parents' occupation, grade and major have a significant impact on campus life satisfaction, and there is a significant positive correlation between them and college students' satisfaction of social integrity. The research showed that a trustworthy society must be built first to improve the satisfaction of college students' campus life.

D. Zhan and Zhou (2011) conducted a survey on customer satisfaction of higher education in China. Their research showed that the substantial improvement of student satisfaction requires not only information-rich and convenient libraries and excellent network quality, but also improved logistics services such as accommodation and canteens, which are the key elements. The study also found that, compared with college students, higher education in China now pays more and more attention to serving the university itself, and college students, as recipients of higher education services, should be the focus of college education services.

He (2011) constructed an evaluation model to measure college students' satisfaction and had many findings. First, students were dissatisfied with quality development, social practice, student reward and punishment system, further education opportunities, mental health guidance and other services. This showed that the university has not done enough to improve students' comprehensive quality and cannot meet students' expectations. Therefore, the university needs to take more active and effective measures, strengthen care for students' physical and mental health, and pay attention to cultivating students' comprehensive quality. Secondly, the university basically meets students' expectations in the aspects of textbook selection, students' shopping, water and electricity consumption, teachers' quality and other services, which shows that teachers, assistants and administrators are more serious and responsible for their work and services, and the university has done a good job in teaching and student management. Third, there is no job service in the university that exceeds students' expectations.

W. Wei (2011) investigated the internal relationship between higher education service quality and student satisfaction from the perspective of students. The samples were college students from six universities in Beijing. The results showed that 12 dimensions of higher education service quality, namely, "material basis, soft input, curriculum and training plan, teaching staff, non-teaching staff, university service, student internship, academic and scientific research, internationalization, fees and subsidies, employment and personal gain", have different effects on student satisfaction. However, the service quality evaluation factors that

affect college students' satisfaction with the quality of educational services are quite different among colleges and universities.

Shi (2008) had some findings in her master's thesis. First, student satisfaction has nothing to do with gender. Secondly, there are significant grade differences in student satisfaction. The difference in total scores was shown as juniors were rated lower than freshmen and sophomores. The general trend is that the higher the grade, the lower the score. Third, there are significant differences in student satisfaction. The difference in total scores is as follows. The scores of rural students are higher than those of small-town students, and the scores of small-town students are higher than those of large and medium-sized city students. The general trend is that the students' satisfaction scores in rural, small towns and big cities are gradually decreasing.

Z. Liu (2007) applied interview, questionnaire survey and multivariate statistics to analyze the input-process-output of higher education and found that students are more concerned about the educational service process. Although employers are very concerned about the educational output, they would pay more attention to the educational service process. However, neither of them cared much about "investment in education".

J. Liu (2009) empirically studied the impact of customer satisfaction on customer behavior. The results showed that service quality has a significant direct and positive impact on perceived value and customer trust, with less and indirect influence on customer satisfaction and customer behavior tendency.

H. Liu (2011) found that institutions of higher learning should build an institutional environment that attaches importance to the evaluation of student satisfaction, improve the degree of emphasis on the perceived service quality of students in higher education, strengthen the image building and tangible display of institutions of higher learning, and further reform the teaching and management mode so as to effectively improve the satisfaction and loyalty of college students and enhance the competitiveness of institutions of higher learning.

Ren (2010) concluded through analysis and research that customer satisfaction theory is also applicable in the field of higher education. The process of running an independent college is a process of serving students, who are the direct customers of educational services. College student satisfaction is an effective indicator to understand the internal management of colleges and universities, and it is also a very useful management tool in college management. The evaluation results of undergraduates in an independent college in Xi 'an are as follows. Students are generally satisfied with the university, but teaching services, library services, student management and support services, campus cultural atmosphere, and life services need to be strengthened.

2.3.2 Higher education service quality and student satisfaction

The research of Hasan et al. (2009) on service quality and student satisfaction found that service quality has a significant positive correlation with student satisfaction. They also found that two dimensions of service quality, including empathy and assurance, are the most critical factors for student satisfaction.

Soutar and McNeil (1996) conducted a study using the SERVQUAL scale to find the gap between students' expectations of service quality and their actual perceived experience of service. He found that students were satisfied with the academic unit survey, but their perception of parking facilities and admission procedures was far from satisfactory. Given that a student's first contact with a university is at the time of admission, it is important that attention be given to improving this aspect of the experience, as it may carry over into the quality of all subsequent interactions. The satisfaction of boys is higher than that of girls.

Ong and Nankervis (2012) used SERVQUAL scale to verify the satisfaction of students in higher education environment in Australia and Malaysia. The results showed that the first and third grade students' expectations of service quality are met. There is no significant difference in service quality between them. Students' perceived service quality exceeds their expectations, so they are satisfied.

Yusof et al. (2012) conducted a study to assess the perception of service quality among students of vocational colleges in Malaysia. The main findings of this study are as follows. (1) Student satisfaction with the service quality of public universities is higher than that of private universities; (2) Students have significantly different views on the quality of services provided by public and private universities. In addition to the quality of tutors, the average score of public universities is higher than that of private universities: (3) The average scores of hardware facilities, service problems, service reliability and hardware equipment are lower. Students are satisfied with the aspects, including teachers, courses and training. As a result, university administrators are focusing on creating environments that can support the training process and customer satisfaction.

Shah (2014) studied the customer service quality of the higher education sector in Pakistan. The dimensions are Tangibles, Reliability, Responsiveness, Assurance and Empathy. The sample came from 22 different universities in four provinces of Pakistan. Shah.FT's research showed that what is significantly related to customer satisfaction is reliability and assurance.

In the comparative analysis of studies on service quality in Kenyan universities, Kimani et al. (2011) found that students believe that service and management quality was the determining

factor. In other words, students' perception of administrative quality is more important than service quality. Quality management provides timely service, personalized attention, sincere performance, proper communication and familiarity with systems and procedures.

Legčević (2010) studied the expectations and perceived service quality of students at Osijek University in Croatia and found that students' expectations were greater than their actual perception. The smallest and largest difference are reliability and inertia dimensions respectively. In addition, there are significant differences between students' views and expectations in five dimensions.

Research by Pariseau and McDaniel (1997) in eight business universities in Pakistan showed that students scored lower in all five dimensions of service quality (tangibles, reliability, responsiveness, assurance, empathy).

Hasan et al. (2009) studied the service quality in private higher education institutions and found that these five dimensions were significantly positively correlated with overall service quality. Students' satisfaction is most correlated with mobility, followed by assurance, tangibles, responsiveness and reliability.

Wong and Sultan (2021) verified perceived service quality and expectations at Islamic Azad University in Iran, and their results showed that there was a gap between students' expectations and service quality. Therefore, reliability, tangibles, responsiveness, assurance and empathy are very important to students. In addition, Islamic Azad University Firoozkooh must allocate more funds to improve its performance.

Yusof et al. (2012) studied the service quality of higher education and found that the tangible dimension is the most important, while the inertia and guarantee are the least important. The results of this research are helpful for scholars and managers to allocate their resources accordingly.

Al-Alak and Alnaser (2012) examined the relationship between service quality dimensions (tangibles, responsiveness, reliability, assurance and empathy) and overall service quality student satisfaction from the School of Business of the University of Jordan. Their research results showed that assurance and reliability are the two most urgent service quality dimensions to be improved.

Ibrahim et al. (2013) used SERVQUAL scale to measure overseas students' expectations and perceptions of the service quality of higher education institutions in Scotland. The structured questionnaire was distributed to 200 graduate and undergraduate students from mainland China and Taiwan studying at Glasgow, Strathclyde, Stirling, West of Scotland (UWS) and Glasgow Caledonian Universities. There are 129 questionnaires available for statistics, and

the author used advanced statistical techniques for analysis. The results revealed a clear gap between overseas students' expectations and perceptions of Scottish universities. Less satisfactory areas included staff's willingness to help overseas students, sincerity in solving students' problems, and faculty feedback. Their research results are similar to previous industry studies and reports. They argued that the success of the Scottish higher education service is due to positive feedback from Scottish universities on the "perceived expectations" gap among overseas students. A sustainable rate of increase in the intake of overseas students to Scottish universities requires improvements in the quality of education services and a better understanding of cross-cultural differences. Therefore, higher education institutions in Scotland may consider setting their service standards to meet the expectations of different overseas students and families. Scottish universities must also realize that the higher education market is made up of both local and overseas students, and meeting the expectations of overseas students will bring positive word-of-mouth communication. One of the service gaps identified in the study was the lack of timely responses to students. Therefore, higher education institutions should train their staff in an effective way to provide good service.

China's scholars' research is also quite sufficient. Y. Zhao et al. (2006) of Beijing Jiaotong University studied the indicators of SERVQUAL scale evaluation of higher education service quality and reached the following conclusions: a) How to define students as educational service objects? b) What aspects of service quality are important to students? c) How can we find out the existing problems and the weaknesses. d) How to improve the service quality and efficiency. Therefore, modifying the SERVQUAL tool as needed allows universities and colleges to identify areas where they are good at or need to improve their service and position themselves for quality of service relative to their competitors.

Y. Shen (2007) from Tsinghua University investigated the perceived dimensions of education service quality with SERVQUAL. His research showed that teacher-student interaction is still the most important feature and evaluation factor of educational service quality, so universities should be more student-centered and give students more care and guidance. Secondly, universities should attach importance to the construction of hardware conditions to provide students with a good learning environment and conditions. Education is intangible and lagging, so it is difficult to judge the effect of education. In this case, the tangible dimension is an important factor to judge the quality of education service. From the point of view of management, tangibles is also a quality factor that universities can easily control and have high efficiency. Therefore, investing in tangible resources is one of the common decisions in the development of universities.

The doctoral thesis of Hong (2007) studied whether there is a significant difference between the satisfaction of students in public higher vocational colleges and those in private higher vocational colleges. He used empirical research methods to investigate six public and private higher vocational colleges in Fuzhou, Xiamen and Quanzhou. The result of his research is that universities must pay attention to the construction of soft environment as well as hardware investment. Only the organic combination of soft and hard environment can effectively improve the satisfaction of college students' reading experience. Among the five dimensions of SERVQUAL, the tangible dimension is the most important, while the remaining four dimensions cannot be ignored.

L. Yang et al. (2011) investigated 8 universities in Nanjing, and the results showed that, overall, students were not satisfied with the service quality of higher education. They are most concerned about their professional prospects. Dormitory management, counselor work, natural environment, student autonomy organization and library management are the advantages of colleges and universities. Canteen service facilities, graduates' popularity, feedback on students' dissatisfaction, curriculum plan arrangement and elective degree of courses are the challenges facing colleges and universities.

L. Chen et al. (2014) from Shanghai Jiao Tong University surveyed 500 postgraduates from three universities in Shanghai about their satisfaction with the quality of postgraduate education services. The study found that students were relatively satisfied with the overall evaluation of the quality of education services, the content of elective courses and the interaction between teachers and students. Subject, family income and other factors will also affect the evaluation of students' higher education service quality.

Z. Hu (2004) defined quality as the life of higher education. He believed that colleges and universities should take customers as the focus of attention, follow the objective laws of higher education and teaching, formulate educational service quality policies, establish quality standards, guarantee measures and evaluation systems, and improve the quality of educational services all-sidedly, comprehensively and continuously, so that colleges and universities can do better.

Z. Hu and Lei (2008) used the mean structure model to test the relationship between college students' input and the quality of higher education services. The result showed that the more time and energy the college students invest, the higher the service quality of higher education. College students are important participants, producers and contributors of educational services.

Y. Sun and Li (2006) believed that education service is the main product of higher education, and the quality of higher education is the quality of higher education service products, namely,

the degree to which service products meet the explicit or implicit needs of the main body of education needs. A reasonable understanding of the basic characteristics of higher education service products, such as invisibility, duality and process, is conducive to the reform of the higher education management system and the improvement of the management level of higher education service quality.

Ma (2004) focused on the quality evaluation of higher education service process in his doctoral thesis. He studied the basic model of higher education service quality evaluation, constructed the gap analysis model between higher education service quality evaluations, and made empirical research and data analysis on the quality evaluation in the process of higher education service by means of mathematical statistics. The results showed that it is scientific and convincing to use gap analysis model to study the quality evaluation in the process of higher education service.

W. Zhan et al. (2010) put forward that the formation of the concept of service quality in higher education is the result of the combination of higher education and service fields in China and is the product of economics. The formation of the concept of higher education service quality has changed people's understanding of the essence of education in the past and promoted the extensive application of people-oriented management methods in various colleges and universities.

X. Li (2009) found that the rights and interests of consumers in higher education are difficult to be guaranteed under the current situation. The phenomena of weak service consciousness, backward management system and inferior quality of education in colleges and universities have not been improved for a long time. The guarantee of the quality of education service is not only involved in the personal interests of consumers, but also is closely related to the future sustainable development of the higher education industry in China. Therefore, we need to implement the principal position of students.

X. Li (2012) used a combination of qualitative research and quantitative analysis in his master's degree thesis to study the service quality of colleges and universities in Xinjiang, student satisfaction and the relationship between them. On the basis of literature review and theoretical analysis, he divided the service quality of higher education into seven dimensions, including tangibles, responsiveness, reliability, assurance, employability, empathy and resultant service quality, and passed the empirical test. The results of variance analysis show that there are ethnic differences in students' evaluation of educational service quality and students' satisfaction.

K. Hu (2009) conducted a questionnaire survey on undergraduate students in a university

in his master's thesis, which proved that the measurement items of this scale have high reliability and validity, and can be used to evaluate the service quality of higher education. She put forward that process quality and result quality are important factors for students to evaluate the quality of educational services. The most important dimension of service quality is resulting service quality, followed by employment and tangibility. There are significant differences in the cognitive level of educational service quality, satisfaction and behavior willingness between age and subject category. There is no significant difference in cognitive level of educational service quality, satisfaction and behavior willingness between gender and students' place of origin.

It can be seen from the literature that the satisfaction evaluation of Chinese-foreign cooperative school running quality mainly includes two levels:

First, the personal level. In terms of age factor, a sample survey was conducted among students in Chinese-foreign cooperative institutions and programs of higher education. The results show that the satisfaction of younger students on service quality is lower than that of older students. In terms of gender, some studies have found that female students' satisfaction is higher than that of male students. For example, Zhao Junsi took three universities in Hubei Province as examples and found that gender has different evaluation levels on university teaching management, and female students' satisfaction is higher than male students. However, some other scholars found the opposite result: girls' expectation of the importance of service quality is higher than boys', while their satisfaction is lower than boys', which indicates that girls' expectation is higher, but their relative satisfaction with service quality is lower. In Chinese and German co-op programs, male students consistently report higher satisfaction than female students. In terms of parents' education level, it is found through research that students whose parents are less educated are less satisfied with service quality than students whose parents are more educated.

Second, the school level. According to the research of relevant scholars, the main influencing factors mostly involve school level, grade, subject and major. In terms of school-level factors, the results show that the satisfaction of students in research universities is higher than that of public general undergraduate universities, higher vocational colleges, private undergraduate universities and other universities. In terms of grade factors, the results show that there are significant differences in students' evaluation of major and curriculum setting, classroom teaching, practical teaching and teaching management in different grades, and the satisfaction of lower-grade students is significantly higher than that of higher-grade students. A survey on the satisfaction of students in a cooperative school-running program of an

independent college shows that there is a significant difference between students of different grades in the teaching quality of foreign teachers. In both Germany and China, the satisfaction of students of lower grades is higher than that of senior students. In terms of subject and major factors, the research results on student satisfaction are also different. It is found that the satisfaction of humanities students is higher than that of science and engineering students, because the sample universities mainly focus on engineering and the engineering development is relatively good. However, Fang Baojun and Chen Minkou found that the major and curriculum have a significant impact on the satisfaction of students' teaching quality. The basic knowledge and practical skills of the curriculum are equally important.

2.4 Learning outcomes

Learning results are indicators to judge learning results, which are intended to let learners know their own learning status and serve as the basis for learners and instructors to improve. Student learning come is the focus and important standard of higher education quality evaluation, which profoundly influences and promotes paradigm change in the high education field.

2.4.1 Definition of learning effectiveness

Learning outcomes are also called "educational results" by some scholars. As early as the 1980s, Spady (1982) was the first to put forward the Outcome-Based Education (OBE). The so-called learning outcome is the ability that the student really has at the end of the learning process.

Since the 1990s, student learning achievement assessment has been recognized as the most effective and specific teaching performance evaluation scheme in the United States. Learning effectiveness refers to the change of learners' knowledge, skills and attitudes after the end of teaching. Learning effectiveness is a pointer to measure a learner's learning achievement, and it is also one of the most important items in the evaluation of teaching quality, as the basis for learners and instructors to improve and adjust in the future. Some scholars believe that the effect is the best performance Hoffman and Schraw (2010), while others think that effectiveness is the relationship between the highest performance and the lowest effort (Van Gog & Paas, 2008). Some researchers are used to two definitions of efficacy (Hoffman & Schraw, 2009), the first of which is the lowest acceptable proficiency in skill performance, that is, the performance of competence. The other is the minimum time and energy to perform skills, which can achieve a high level of ability performance (Hoffman & Schraw, 2010).

Kolfschoten et al. (2010) figured that learning effectiveness refers to the skills and

knowledge acquired by novice learners, which enable them to start performing tasks like experts. Extensive learning effectiveness is defined as the ability to achieve established learning goals with minimal time, effort or cognitive resources. Piccoli et al. (2001) pointed out that learners' learning outcomes in the learning process are learning outcomes. The purpose of effectiveness is to examine the achievement of learning goals. They pointed out that learning effectiveness is the change of learners' knowledge, skills and attitudes after learning. Gallavara et al. (2008) held the view that learning effectiveness is a description of what a learner has learned, understood and can do after a period of learning. Linnenbrink and Pintrich (2002) put forward that learning effect is to acquire knowledge, skills and reasoning ability through a period of practice or study, so as to change one's behavior pattern, and use the acquired ability to solve problems and improve one's working ability. In the field of higher education, the connotation of students' learning outcome has been extremely rich interpretation and has been defined by scholars from different countries. At present, the widely accepted definition refers to the specific and measurable improvement of students' knowledge, ability, emotional attitude and other aspects after receiving higher education. It is to decompose the goal of talent training into a clear, explicit, and operable index, so as to evaluate the learning quality of students. Therefore, students' learning outcome are the most critical and direct evidence of the quality of talent training.

2.4.2 Evaluation of Learning Effectiveness

As an indicator to measure learning outcomes, learning effectiveness is also one of the most important items to evaluate teaching quality. Learning effectiveness would be influenced by learning style, curriculum design and teaching methods. Piccoli et al. (2001) held that learning effectiveness refers to the changes of learners' cognition, affection and skills after the end of teaching. Saleh and Kim put forward the evaluation method of learning effectiveness in 2009, arguing that it can provide more fair and reasonable evaluation methods, namely accuracy, completion time, difficulty, complexity and the value of answers. At present, besides the commonly used paper and pencil test, there are many other evaluation tools commonly used in the education sector to evaluate students' learning effectiveness. It is difficult to evaluate the learning effectiveness objectively and concretely, but the evaluation criteria are quite consistent among scholars. Wexley and Latham (1991) thought that trainees can best know whether they have achieved results in learning. Baldwin and Ford (1988) found in their research that self-assessment is adopted in most studies to measure the change of learners' behavior after learning.

MacGeorge et al. (2008) discussed the influencing factors in the evaluation (audience response technology, ART), and divided the influencing factors into objective and subjective terms as the evaluation criteria, in which the objective factor is learning effectiveness, while the subjective factor is self-perception.

Cartwright et al. (2009) believed that the complete achievement of students' study should consist of the following three stages. The first stage is the definition stage, which defines the important goals that the student can learn as a result of the learning experience. The second stage is the assessment stage, in which the degree to which students achieve important learning objectives is assessed. The third stage is the application stage, during which curriculum planning, design of learning, and teacher teaching are improved according to the results of the assessment stage. Therefore, when our teaching model is one that values student learning outcomes, the curriculum, teaching and evaluation should be flexible and seen as adjustable to meet the final desired outcome.

Many scholars put forward different training effectiveness evaluation models, such as Kirkpatrick (2009), Brinkerhoff (2006). Although there are many training effectiveness evaluation models, most of them are similar in spirit or content to the four-level evaluation model proposed by C. C. D. Wang and Castañeda-Sound (2008) The American Society for Training and Development (ASTD) reported in May, 1998 that about 90% of American enterprises or organizations would evaluate their training courses, and 67% of them adopted Kirkpatrick, which is the most widely used evaluation model in practice because of its simplicity and understanding. It is also the first to put forward a complete evaluation model for training effectiveness evaluation. Kirkpatrick evaluation model can be used to understand how training contributes to organizational goals and objectives, to support the existence of training departments, and to serve as a criterion for the sustainability of training programs, from which important information about the improvement of the training program can be obtained McFarlane (2006). The four-level evaluation model proposed by Kirkpatrick in his "Techniques for Evaluation Training Program" developed in 1959 is the most complete framework and the most widely used. The content consists of four levels of response, learning, behavior and outcome as the measurement dimension of learning effectiveness evaluation. The contents are detailed as follows. (1) Reaction. It can be defined as the degree of learners' liking or satisfaction with a specific course or program, and the evaluation at this level does not include any knowledge or skills learned. (2) Learning. It can be narrowly defined as learners' understanding or absorption of theories, facts, knowledge, skills or any information provided by courses or programs. (3) Behavior. It can be defined as the degree of learners' behavior change after

participating in the course plan. (4) Results. It can be defined as the contribution of learners' changed behaviors to their work, family and community after completing the courses or programs (McFarlane, 2006).

2.5 Chinese-foreign cooperation in running schools.

In the era of economic globalization, the trend of internationalization of education is also unstoppable. In order to keep up with the tide of globalization, many countries are carrying out educational reform to improve their international competitiveness. Through international exchanges and cooperation, all countries are promoting the flow and rational allocation of quality education resources around the world. This process not only reserves talents and provides intellectual support for economic globalization, but also meets people's demand for higher education. Cooperative school running has become a form of education internationalization (J. Zhao, 2009).

2.5.1 Motivation and significance of Chinese-foreign cooperation education

The development and progress of the global higher education market is considered to be a favorable trend. When government funding for higher education shrinks, the demand for higher education will increase sharply, which mainly occurs in developing countries like China. Therefore, ways must be found to serve these additional students (Altbach, 2000). Chinese-foreign cooperation in running schools has become a very popular way to introduce educational resources. At present, most literature has studied the causes of the formation and development of Chinese-foreign cooperative education projects. From the perspective of needs, these causes can be divided into internal and external needs. From the perspective of internal demand, Chinese-foreign cooperation in running schools can develop because of the need to introduce high-quality resources, improve education level and enhance China's international competitiveness in education (Weng, 2019). In order to achieve the purpose of building a powerful country of higher education and improving the quality of higher education. In terms of external demand, the reasons for carrying out Chinese-foreign cooperative education programs are to provide diversified education for China, introduce advanced foreign teaching concepts, develop the education market, and achieve fair competition among universities at all levels (Alam et al., 2013). This is not only the need for China to realize human resources power and train international talents to cope with economic globalization, but also the urgent need to develop China's economic and social benefits. At the same time, for foreign parties, Chinese-

foreign cooperative projects are needed for the development of overseas labor market and the cultural exchange between foreign parties and China (Z. Liu & Huang, 2015).

There is a close connection between higher education and politics, economy and culture. Therefore, the motivation of Chinese-foreign cooperation in running schools should be analyzed from the macro level of the government, the main body of the cooperation in running schools, and the micro level of the education consumers(Weng, 2019). From the macro level of the government, the policy goal of Chinese-foreign cooperation in running schools is to promote the discipline construction and the reform of the management system and mechanism within institutions of higher learning, promote the construction of "double first-class", promote Chinese education to the world education center, and provide "Chinese wisdom" and "Chinese solutions" (J. Lin, 2018). The Chinese government has realized that if a country wants to develop, it is necessary to open its door to the outside world, to learn from the world's advanced science and technology, and to learn from each other. Transnational higher education is an important way to achieve this goal. The Chinese government believes that through Chinese-foreign cooperation in running schools, high-quality foreign educational resources can be introduced to improve the quality of personnel training. At the same time, it is beneficial to promote the internationalization of Chinese higher education and promote the development of Chinese higher education (Dong & Ni, 2020). For the Chinese government, allowing these Chinese-foreign co-operatives to enroll students is a boon because students at multinational institutions do not go to traditional universities, thus saving a lot of higher education costs of the government (Bordogna & Healey, 2014). Among the subjects of Chinese-foreign cooperation in running schools, the motivation of the foreign subjects to actively participate in the cooperation in running schools is shown in earning huge economic benefits, solving the problem of surplus education in their own country, and expanding their own popularity. China's higher education market has great potential and has become the focus of developed countries and regions (J. Wang et al., 2020). While the motivations for foreign participation are genuine enough, they are not the whole story. There are also a number of Chinese-foreign partnerships aimed at promoting international research, teaching and student learning, such as the joint management degree program at 28 Jesuit universities in the United States and Peking University (Smith, 2014). It really promotes the progress of international research and cultivates national talents. The motivation of Chinese school-running subjects to carry out cooperative school-running mainly comes down to the following aspects: first, through cooperative school-running, foreign high-quality educational resources, advanced school-running ideas, school-running modes, successful management experience and advanced equipment can be introduced; second,

cooperation in running schools can make up for the shortage of educational funds; finally, through cooperation in running schools, specialty construction can be improved and talent training can be accelerated (F. Gao, 2018).

It is of great significance in theory and practice to carry out Chinese-foreign cooperation in running schools. From the perspective of theoretical significance, Chinese-foreign cooperation in running schools is conducive to learning from the experience and model of foreign countries, absorbing the successful experience of many countries, and further perfecting and improving the relevant policies and systems in China. For example, Australia, the United Kingdom, the United States, Germany and other countries promote the development and progress of their own education through the development of national qualification framework, and the implementation of "credit accumulation system", "prior learning recognition system", "learning experience certification system" and "accumulation system of academic competence appraisal" (Arkoudis, 2005). The introduction of these advanced systems can provide more theoretical guidance for the perfection of Chinese-foreign cooperation in running schools in China. In terms of practical value, through Chinese-foreign cooperative education programs, the quality of education, social reputation and scientific research level of relevant Chinese institutions can be continuously improved (A. Li, 2012). Through Chinese-foreign cooperation, the selection and introduction of high-quality educational resources can be realized, such as advanced school-running concepts, excellent teachers, high-quality courses and textbooks, and teaching and evaluation methods (Song & Zhang, 2008). At the same time, Chinese-foreign cooperation in running schools can also realize the establishment and implementation of the fusion mode of cooperation in running schools, which is embodied in the integration of curriculum setting and the optimization of talent training programs. Grafting original textbooks to improve teaching materials; Integrating Chinese and foreign teachers to improve the quality of teachers; Strengthen English foundation and improve learning ability (Y. Wang, 2015).

In general, the significance of Chinese-foreign cooperation in running schools lies in the following points: the increasingly diversified learning needs of students can be met; various educational resources and information can be shared; the plight of domestic education can be remedied and the equitable development of education can be realized; Cultivate new talents with cross-cultural, international communication adaptability and thinking mode can be trained (Marginson & Mollis, 2001).

2.5.2 Development status of Chinese-foreign cooperative education programs

Over the past decade, transnational education has become an integral part of the internationalization of higher education (Zhuang & Tang, 2012). International branches are springing up all over the world (Lawton & Katsomitros, 2011). There has also been an unprecedented expansion of Chinese-foreign joint education programs, such as the University of Nottingham opening campuses in Malaysia and China, and the University of Liverpool opening campuses in (F. Yi, 2013). At present, students in Chinese-foreign cooperation schools tend to major in economics and management, which provides better career prospects for graduates. In recent years, the total number of students in higher education has increased rapidly, and the number of students in Chinese-foreign cooperation schools has also advanced by leaps and bounds. After years of development, the overall situation of Chinese-foreign cooperation in running schools is good, but its drawbacks cannot be ignored. The main disadvantage is that transnational higher education is always unequal, and institutions in developed countries sell their educational products abroad (M. Wu & Li, 2015). Usually they sell to developing countries such as China, but decisions about curriculum, standards, faculty and requirements are made by the seller (Healey et al., 2014). This makes China in a passive position in Chinese-foreign cooperation in running schools. Besides, the effect of Chinese-foreign cooperation in running schools has not been evaluated to a large extent, whether in terms of teaching quality or service quality.

With the improvement of economy and the deepening of foreign exchanges, the level of Chinese-foreign cooperation in running schools is also improving day by day, which is in line with the growing consumer demand of higher education. The study of the policy of Chinese-foreign cooperation in running schools pointed out that "education output" is the guiding target of Chinese-foreign cooperation in running schools in China at present, and only by holding this guiding target firmly can the quality of Chinese-foreign cooperation in running schools be really improved (L. Gao, 2012). In the same year, it also proposed that China should actively improve the institutional environment, perfect the education quality guarantee mechanism, introduce the world's excellent education resources, and establish a sound education trade service mechanism (X. Xu & Gao, 2012). Lu et al. (2013) pointed out problems existing in the course of Chinese-foreign cooperation in running schools, such as unbalanced development stage, low level of cooperation, mismatching of cooperation objects and repeated construction of professional disciplines. Many foreign scholars have also done a lot of research and analysis on it. According to Rodman and Nada (2008), quality assurance plays an important role in Chinese-foreign

cooperation in running schools, and the establishment of a quality assurance system should be accelerated.

The development trend of Chinese-foreign cooperation in running schools also presents many characteristics. In this regard, Xia and Wei (2013) concluded that the current trend of exchanges and cooperation among international colleges and universities is generally characterized by institutionalization and diversification. H. Zhang (2014) identified Guangxi higher vocational colleges as the research object and pointed out that their development trend of international exchange and cooperation is characterized by diversification. L. Wu (2017) pointed out in her research that the overall characteristics of the development trend of Chinese-foreign cooperative education are varied, bidirectional and online, while in the process of local Chinese-foreign schooling, there is a trend of the involvement of local governments.

Some scholars have also analyzed and studied the current situation of Chinese-foreign cooperation in running schools in China based on the cooperation between Chinese and foreign universities. In their study, S. Zhang and Guo (2020) mentioned that compared with the general higher education model, the Chinese-foreign cooperative education policy is stronger and has a wider scope, and will have a very broad future. In addition, the study also pointed out that the ratio of teachers and students in Chinese-foreign cooperative schools is generally lower than that in similar institutions of higher education, and the proportion of foreign teachers is generally higher. Although some first-class universities have accumulated experience and introspection in the long-term Chinese-foreign cooperation in running schools, and have gradually explored and formed a series of innovative systems, there are still many immature places in the system exploration (Zhou, 2013). Based on the Chinese-foreign cooperation in running private universities, scholars also have related studies. Xue (2016) mentioned in his research that the development of Chinese-foreign cooperation in running private universities has its particularity. First of all, the private universities in the eastern and central regions run more Chinese-foreign cooperative schools. Secondly, the majors offered by Chinese private colleges and universities in Chinese-foreign cooperative schools are mainly economics and management (Alonso & Câmara, 2016). In view of this, we can draw the conclusion that the deficiency of Chinese private universities in running schools lies in the small scale and lack of characteristics. These deficiencies are caused by private colleges, which are weak in running schools independently and lack of real understanding of Chinese-foreign cooperation in running schools. In the future, China's private universities still have a long way to go to improve the level of Chinese-foreign cooperation in running schools.

In general, China's Chinese-foreign cooperation in running schools is developing well, but

the deficiency lies in the uneven quality of running schools, the lack of school-running characteristics, and inadequate education quality and service quality guarantee system. If we want to promote the development of Chinese-foreign cooperation in running schools towards high quality, we must focus on solving the above problems.

2.5.3 Evaluation of service quality of Chinese-foreign cooperation in running schools

The realization of Chinese-foreign cooperation in running schools requires correct handling of the four fundamental relationships involving the overall situation, namely, the relationship between serving the overall situation and serving students, the relationship between scale, speed and quality and benefit, the relationship between introduction, absorption and integration of innovation, and the relationship between short-term mechanism and long-term mechanism (J. Lin, 2018). Chinese-foreign cooperation in running schools should not only pay attention to teaching quality, but also pay attention to service quality. Strictly speaking, the scope of service quality is wider, including teachers, teaching facilities and teaching environment. Then, how to evaluate and improve the service quality of Chinese-foreign cooperation in running schools? The evaluation of service quality is the investigation, measurement and identification of the perceived service quality by the service provider. From a management perspective, good service must meet the following criteria: standardization and skill, attitude and behavior, accessibility and flexibility, reliability and loyalty, self-repair, reputation and credibility. Most of the existing studies on Chinese-foreign cooperation in running schools mostly focuses on investors, Chinese and foreign schools and the educational management institutions of government organs. They studied how to learn from and absorb the advanced educational concepts and experience of foreign countries, and how to introduce the training plans and curriculum of foreign countries (Feng, 2012) instead of the satisfaction of education consumers and students with school quality and service quality. At the same time, the post-evaluation method of the national education administration institutions is not strict in the supervision of the teaching process, resulting in the uneven quality of Chinese-foreign cooperative schools and inconsistent social evaluation (Fu & Pan, 2011). Xue (2017) believed that the quality construction of Chinese-foreign cooperative education must focus on courses, teachers and teaching to promote the quality construction of Chinese-foreign cooperation in running schools. Tan and Liu (2019) believed that various quality problems existing in Chinese-foreign cooperative education, including service quality and teaching quality, must be solved through the combination of internal and external management and the establishment of tripartite management involving the school-

running unit, the government and social forces. The improvement of the quality of educational service, from the perspective of students, is the students' educational needs and feelings of educational experience, and their evaluation of the quality of educational service.

2.5.4 Evaluation of learning outcomes in Chinese-foreign cooperation in running schools

At present, most of the studies on Chinese-foreign cooperative education focus on teaching quality, student satisfaction, and policy objectives, while there is little research on the service quality and learning effect of Chinese-foreign cooperation in running schools. However, service quality is not only related to students' satisfaction, but also has a great correlation with students' learning outcomes, which is of vital importance for the development of Chinese-foreign cooperative education projects. Therefore, this thesis summarizes the evaluation methods of learning outcomes in existing studies and sorts out relevant literature on the possible influence of service quality of Chinese-foreign cooperative school running on learning outcomes.

The United States, the United Kingdom, the European Union and other countries have relatively more studies on the evaluation of students' learning outcomes, among which the United States has the most far-reaching research. At present, the evaluation of student learning outcomes has been common in the United States, which has become an effective means for American higher education to respond to social accountability externally and introspect internally. In the mid-1880s, American higher education attached great importance to students' academic performance. Because of the social concern caused by the decline of university quality, the United States began to take students’ academic achievements as the main axis for the evaluation of higher education. The main purpose of the evaluation of sports is to assist the university systematically collecting students' relevant data, and to improve the overall quality of teaching (Steedle et al., 2010). In the United States, the study on the evaluation of student learning outcomes has been continuously questioned and improved and has been further deepened both in theory and practice.

Firstly, the theoretical research focuses on the evaluation of students' learning achievements. In 1996, the American Association for Higher Education laid out nine principles for evaluating student learning. In addition, the report submitted by the University of California, Los Angeles (UCLA) to the Association of Western University Accreditation (CACA) proposed principles for evaluating the department's student learning outcomes: to determine what the department's graduates should master most; to focus on the learning outcomes goals of student performance rather than the teaching goals of teachers; the results should not be too broad or too targeted.

General abilities such as critical thinking, writing, research, and subject-specific expertise, concepts, theories and methods should also be taken into account. Use explicit "verbs" to describe observable learning outcomes, such as performance, creation, manufacture. Each learning outcome must be measurable so that evidence of learning outcomes can be gathered. In practice, the United States focuses on the choice of evaluation criteria, the application of evaluation tools as well as the analysis of the evaluation results. For example, the preparation of evaluation, the setting of evaluation benchmarks, the selection and use of assessment tools, summary and analysis of the evaluation results, and the development of the evaluation drive were discussed (Suskie, 2009). Tynjälä et al. (2001) believed that learning outcomes should closely link learning knowledge with various abilities, including practical ability, cognitive ability, ethical ability, and establish these abilities in an independent framework system. The evaluation of learning outcomes is ultimately not just about evaluation, but about accurate and meaningful learning, taking on meaningful responsibility, and improving knowledge and ability.

At present, the research on student learning achievement evaluation in China is still in the period of drawing lessons from foreign research results. L. Lv (2012) sorted out and studied the evaluation of students' learning results from the content and methods of evaluation, and introduced what to evaluate and how to evaluate learning results. J. Zhang and Yang (2013) made a comparative analysis of four evaluation models of American students' academic performance from the perspective of specific cases and found that four kinds of models take education objectives as the starting point of evaluation, and start from different interest subjects. However, the four models of applicable object and the specific operation are different. P. Gu et al. (2014) divided the ability requirements in learning results into engineering reasoning and problem-solving ability, experimental exploration and knowledge discovery ability, integrated thinking, team work and communication ability, professional ability and attitude. Integrative thinking includes critical thinking, systematic thinking and creative thinking. F. Wu (2014) conducted a survey on the general education achievements of undergraduates in China's "Project 985" universities and found that there is still a gap between the actual improvement degree of students' expression ability, critical thinking ability and scientific research ability in general education and the goal emphasis degree of undergraduate education.

At present, the specific model of college students' learning outcome evaluation has been widely studied in the academic circle. Teng (2017) believed that the traditional measurement of learning is vague and that the raw score, as the sole method of assessment, does not reflect the true ability of students. He chose a Rasch model measurement and analysis method of engineering mathematics to measure students' learning outcomes. The National Learning

Achievement Evaluation Committee (NILOA) has put forward a complete theoretical framework of learning outcome evaluation, and established a two-way cycle of learning outcome evaluation, including evaluation planning, resource preparation, existing project review, learning outcome data collection, application of evaluation results, and statement of learning outcome objectives. The Assessment of Learning Outcomes in Higher Education (AHELO) was launched by the Organization for Economic Co-operation and Development (OECD) in 2008. J. Zhang and Yang (2013) explored the evaluation model of American college students' learning outcomes and proposed the general process of the competency oriented model, namely, defining goals, defining capabilities, following principles and continuous evaluation. D. Yu and Yang (2014) constructed a learning effect evaluation model for engineering undergraduates based on NSSE, NILOA and CIRP survey scales, which mainly included engineering design ability, engineering practice ability, integrated innovation ability, autonomous learning ability, cooperative communication ability and critical achievements. S. Wang and Kang (2016) extracted the elements of learning outcomes by factor analysis with the IEO model as the theoretical framework. Y. Xi et al. (2013) constructed the evaluation system from five indicators including academic achievement, scientific research practice achievement, proposal achievement, mid-term achievement and defense achievement, and set up evaluation items under it. These five dimensions are all quantitative scoring, which, in his opinion, can make the training unit deliver information and feedback efficiently and reflect students' learning results more accurately. Z. Yi (2017) believed that ability orientation is a dual index to test the quality of students output by colleges and universities and the quality of school education achievements, and put forward a "competency-oriented" evaluation model for students' output to realize the comprehensive transformation of evaluation content to professional knowledge, skills and attitude. S. Shen (2017) proposed an evaluation model for the comprehensive quality of graduate students, which divided the comprehensive quality of graduate students into four indexes: self-drive, emotional quality, ability quality and knowledge quality. W. Zhang and Ke (2018) studied the feasibility of Bloom's educational goal classification theory and used Delphi method technology and analytic hierarchy process to explore postgraduate learning outcomes, which were divided into general knowledge, general skills, attitudinal knowledge and professional skills.

According to the above literature, most scholars have realized the importance of evaluating the learning results of college students, so they have expanded and extended the methods of evaluation of learning results and proposed a large number of evaluation models. Based on the previous research results, this thesis intends to evaluate the learning outcomes of students in

Chinese-foreign cooperative schools by using a competency-oriented model.

2.5.5 Service quality and learning outcomes of Chinese-foreign cooperation in running schools.

The existing studies rarely focuses on the learning outcomes of students in Chinese-foreign cooperation in running schools, and service quality has less influence on learning outcomes. As the main carrier of the internationalization of higher education, the quality of students' training should meet the requirements of internationalization, and the orientation of students' learning results should take the initiative to meet the international quality standards (Ye, 2016). At present, results-oriented education is widely used in the field of international engineering education certification, but the domestic engineering education certification task is heavy, the amount of money falls short of the demand, especially the professional certification system for Chinese-foreign cooperation in running colleges and universities is still blank (Guo, 2015). Therefore, it is worthwhile to evaluate the results of Chinese-foreign cooperation in running schools, and to include the service quality of Chinese-foreign cooperation in running schools into the factors that affect the learning outcomes.

In essence, the process of students' receiving education is a process of educational consumption, and a process of increasing the value of human capital, including their own ability and quality. When the service quality of higher education meets and surpasses customer expectations, the service quality of higher education reaches a relatively high level (S. Zhang & Li, 2008). With the deepening of the research on the service quality of higher education, people have realized the particularity and importance of the service quality of higher education, which has an important impact on students' learning results (Yao, 2020). Bao (2014) believed that in the Chinese-foreign cooperation in running schools in colleges and universities, the corresponding students are the consumers of this kind of school-running service. Only these consumers can evaluate the service quality of higher education, and all other judgments are irrelevant. Students' evaluation of service quality is related to learning outcomes. Zhong et al. (2012) conducted a sample survey of students in Chinese-foreign higher education cooperatively run schools and projects, and the results showed that: younger students' satisfaction with service quality is lower than that of older students, and female students' expectation of the importance of service quality is higher than that of male students, while their satisfaction is lower than that of male students. This indicates that female students' expectations are higher, but their relative satisfaction with service quality is lower. According to the survey

and analysis results of H. Chen (2010), among students in Chinese-German cooperative education programs, male students always give higher evaluations on service quality than female students. According to the customer satisfaction theory, Clemes et al. (2008) regarded students as consumers of higher education services and believed that among the three factors of price, university image and service, service plays an important role in students' satisfaction and learning outcomes.

Most scholars' researches on the service quality of Chinese-foreign cooperation in running schools mainly focus on the evaluation of the learning process, while only a few scholars pay attention to the evaluation of service quality from the perspective of learning results (Sojkin et al., 2012)， Y. Liu (2018) believed that students' satisfaction with education service is not only related to the experience of learning process, but also to the evaluation of learning harvest. This shows that the service quality of Chinese-foreign cooperative education projects in colleges and universities affects the overall evaluation of students and the learning outcomes of students to a great extent. Therefore, a few scholars have carried out relevant research. Ali et al. (2016) applied the HEDPERF (Higher Education Satisfaction Measurement Model) scale to investigate the service quality of higher education institutions from five dimensions, including teacher level, non-teacher level, opportunity, curriculum and school reputation. The research found that teachers and curricula have the strongest influence on students' learning outcomes. This fully shows that professional learning can not be separated from various services provided by higher education, including Chinese-foreign cooperation in running schools, and good learning results can not be separated from excellent service in running schools.

A large number of scholars have also conducted studies on the influence of various aspects of school conditions (including the service quality of Chinese-foreign cooperative schools) on learning outcomes. The level and type of the school itself will affect the students' learning results, and the students' learning results of doctoral degree colleges are better than those of ordinary colleges (Toutkoushian & Smart, 2001). The cognitive learning outcomes of students in research colleges are higher than those of students in vocational colleges (McCormick et al., 2009). In terms of school environment, Wilson (1995) analyzed that school and class atmosphere had significant influence on learning results from the perspective of teaching environment. When the classroom environment is relaxed, lively, cohesive and organized, students can generally achieve better academic performance. In the aspect of school interpersonal environment, school interpersonal relationship, including mentor relationship and peer relationship, has significant predictive effect on students' non-academic achievement, especially school happiness(W. Zhu et al., 2017). When students form a good interactive

relationship with their tutors and get their support, the number of academic publications of students will be affected (Cronan et al., 1986). B. Zhao (2018) clearly pointed out that teacher-student interaction has a predictive effect on learning results through structural equation model, and constructed a comprehensive student-teacher interaction system.

According to the literature mentioned above, both the satisfaction and expectation of Chinese-foreign cooperative school students on service quality indicate that service quality has an impact on learning outcomes. At the same time, the level and type of the university itself, the teaching environment, the classroom environment, the interpersonal environment (especially the teacher-student relationship) all belong to the category of service quality, and the influence of these factors on the learning results can also be understood as the influence of the Chinese-foreign cooperation in running schools on the students' learning results.

2.6 Chapter summary

This chapter combs and summarizes the research results of higher education service quality, which not only helps to give theoretical guidance on how to solve the problems of quantitative development and quality improvement of higher education, but also provides some new ideas for the subsequent research on quality of higher education in China.

In the field of higher education, research on the quality of educational services has achieved significant results. Domestic and foreign scholars have developed various measurement scales for measuring the quality of educational services in higher education. At the same time, research on measuring the quality of education in Chinese-foreign cooperative education has been conducted from the national to the individual levels. These studies have provided a certain basis for this research in terms of perspectives, research purposes, and research methods. However, there are significant differences in the understanding and recognition of the connotation, composition, and measurement of service quality under different perspectives, whether in terms of service quality, higher education service quality, or Chinese-foreign cooperative education service quality. Different studies also show differences in the selection of the field and objects of service quality. In the field of Chinese-foreign cooperative education, there is no consistent theoretical system regarding the research on service quality.

Literature consistently emphasizes that quality is the lifeline of higher education. Improving quality is the core and most urgent task of education reform and development, and the outstanding requirement of the current state for the development of higher education. Quality construction is the core orientation of Chinese-foreign cooperative school development, and

perfect quality guarantee mechanism is the fundamental to ensure quality construction. Each Chinese-foreign cooperatively run school institution or project shall tailor its own quality standards according to its own school-running orientation, type, student population, diploma and certificate. The state should strengthen the supervision, supervision and precise services of Chinese-foreign cooperation in running schools, and establish think tanks to provide strong theoretical and professional support for the quality construction of Chinese-foreign cooperation in running schools of higher education. The key contents and links such as school-running ideas, asset management, teaching quality, teaching staff, internal and external benefits should be inspected and information should be disclosed, so as to improve the level of cooperation in running schools and the ability of sustainable development.

Through reading and summarizing the above literature, we find that a lot of achievements have been made in the four aspects of transnational education, Chinese-foreign cooperation in running schools, service quality and learning results. Most of the literature on Chinese-foreign cooperation in running schools has pointed out the motivation and significance of carrying out the project, and most of the literature has affirmed the positive role of Chinese-foreign cooperation in running schools. There are also abundant researches on service quality, which are mainly reflected in the evaluation of service quality in various industries. There is also a lot of literature on the influence of multiple factors of higher education on students' learning outcomes. The existing research results are worth learning from, but there are still some deficiencies.

First, there are relatively few articles on the service quality of Chinese-foreign cooperative school-running projects. At present, scholars have done a lot of research on service quality, especially the service quality of higher education. However, the literature on the service quality of Chinese-foreign cooperation in running schools is very limited which leads to the lack of clear and unified measurement standards for the service quality of Chinese-foreign cooperative education. The construction of the evaluation system of service quality of Sino-foreign cooperative universities can provide scientific guidance and suggestions for the construction and development of Chinese-foreign cooperative colleges and universities.

Second, there is little literature on the impact of education service quality on learning outcome and less research on the impact of service quality on student learning outcomes in Chinese-foreign cooperative colleges and universities. A lot of literature has studied the influence of teaching quality on learning outcomes, but few kinds of literature analyze the influence of education service quality on students' learning outcomes. As consumers of educational services, students in Chinese-foreign cooperative colleges and universities attach

great importance to service quality, which not only affects their choice of study, but also affects their learning outcomes. In order to promote the development of Chinese-foreign cooperation in running schools, it is very important to analyze the influence of all aspects of services on students' learning outcomes.

Third, it is not clear how the educational service quality influences learning outcome in Chinese-foreign cooperative colleges and universities. As the most intuitive evaluation of students to Chinese-foreign cooperative colleges and universities, the role of student satisfaction in the relationship between the two needs to be analyzed. Besides, there has been a lot of research on the relationship between the quality of educational services and student satisfaction. However, as a special educational institution, the relationship between educational service quality and student satisfaction may show some new characteristics in Chinese-foreign cooperative colleges and universities.

Given the shortcomings of the above existing literature, this thesis will base on the service quality to build a SERVQUAL model of Chinese-foreign cooperative education project and explore the specific impact of its quality on students' learning outcomes. This can not only contribute to the quality management theory, but also provide scientific guidance and suggestions for the construction and development of Chinese-foreign cooperative colleges and universities, improve students' satisfaction and promote talent training.

Chapter 3: Research Methods

This chapter introduces the study methods and their application in the research, data collection and processing, and technical route. The specific process of the study was elaborated, including the index selection process and model construction process of the SERVQUAL model. Then, questionnaires are designed according to the model, and distributed to all kinds of participants in Chinese-foreign cooperative education and collected, laying a foundation for data analysis.

3.1 Basic elements

The basic elements involved in this research include: perceived service quality, international interaction participation, student satisfaction, learning outcomes. Before establishing the conceptual model and putting forward the research hypothesis, these basic elements are described based on the background of this thesis.

3.1.1 Perceived service quality

In recent years, China's service industry has developed rapidly, but the development of various industries is uneven. There is still a considerable distance from the level of the service industry in developed countries, and service quality is the bottleneck plaguing China's service industry. Education service is an important part of China's modern service industry. Students are the object of school education, and education service is the educational product of school, namely, education quality. The quality of educational products determines the survival and development of schools. The quality of service determines the quality of educational products.

3.1.2 International interaction participation

Accurate orientation of Chinese-foreign cooperative education is the premise of quality construction of Chinese-foreign cooperative education. As a kind of school-running activity jointly organized by Chinese educational institutions and foreign educational institutions, Chinese-foreign cooperation in running schools has its incomparable unique advantages and is known as the "third carriage" in the field of higher education besides public and private ones. More and more international organizations actively advocate and promote the quality assurance

of cross-border education and establish their own cross-border education quality assurance models. The effective protection of students' rights and interests has become an important aspect of cooperation in running schools. The concept of educational quality must start from students' daily learning activities and pay attention to the generation of students' ability and their personal growth and development under the background of international interaction and participation. Through international interaction and participation, students can improve the service quality of Chinese-foreign cooperative education and their personal ability level.

Compared with general higher education, Chinese-foreign cooperative education has its own particularity, which is why participation in international cooperation is an indispensable part of Chinese-foreign cooperative education. International interaction participation becomes an important element of this study.

3.1.3 Student satisfaction

As an important topic of total quality management, student satisfaction survey is a part of Chinese-foreign cooperative education research, which aims to take students as important customers and confirm the problems existing in universities. Through the student satisfaction survey, we can find out where the service quality of colleges and universities needs to be improved and put into action. Time series data can also be used to predict trends and contribute greatly to the success of institutions. Conversely, myopic views of student satisfaction can have far-reaching consequences, causing serious problems with recruitment and retention, and thus damaging the institution.

3.1.4 Learning outcomes

Talent cultivation is the core of education. In the practice of Chinese-foreign cooperation in running schools, all work needs to focus on improving the quality of Chinese-foreign cooperation in running schools and improving the quality of personnel training. Only in this way can we achieve tangible results. Chinese-foreign cooperation in running schools has become an integral part of China's education, gradually entering a new stage of high-level and demonstration development and forming a new normal of connotation construction and quality improvement. The success of teaching based on curriculum standards is judged by students' learning outcomes. In Chinese-foreign cooperatively-run schools, the evaluation of performance is to judge specific performance evidence according to jointly identified performance standards, that is to say, the judgment of students' progress and performance

quality must reflect the characteristics of appropriate performance listed in the curriculum standards.

3.2 Research conceptual model

Based on the basic elements of the study, the research conceptual model illustrates the relationship between variables. Conceptual models pave the way for further hypothesis and questionnaire design.

3.2.1 Service quality evaluation

From the literature review, it can be seen, that service quality is of great value to organizations and has been concerned and studied by many scholars. Among the research on service quality evaluation, the most famous one is the SERVQUAL model carried out by PZB group. By understanding the target's service needs and perceptions, it provides an organization with a way to manage and measure quality of service. Therefore, this thesis will establish a complete set of scoring system from five different dimensions, and evaluate the service quality of the evaluation object quantitatively according to the score level, which has high research value.

In their pioneering research, PZB identified specific dimensions (or attributes) of service quality, which are the criteria that consumers use to evaluate service quality. Taking Chinese-foreign cooperative education as an example, the five dimensions refer to:(1) tangibles: this factor is related to service facilities, equipment, raw materials, and the appearance of faculty and staff -- tangible to represent Chinese-foreign cooperative education services.(2) Reliability: the ability to reliably and accurately fulfill the commitment of education service -- act in accordance with the commitment.(3) Responsiveness: Chinese-foreign cooperation in running schools has the desire to help students and can solve the problems faced by students quickly and effectively, that is, to provide convenient service spontaneity -- take the initiative to help students.(4) Assurance: staff's behavior can enhance students' confidence in Chinese-foreign cooperation in running schools. While they make students feel safe, they also have the corresponding knowledge and ability to solve students' problems with sincerity. The knowledge possessed by the staff and their modest character can stimulate the sense of trust. (5) Empathy: put yourself in the shoes of students and give personalized service to students. At the same time, the service time should fully consider the actual situation of students -- students as individuals to treat.

3.2.2 Student satisfaction and learning outcomes.

In academic research, a relatively mature research system has been formed on student satisfaction and learning outcomes, but most of the research is separate study of satisfaction and learning outcomes, and do not combine the two. In the context of higher education, the concept of student satisfaction mainly originates from customer satisfaction. From the perspective of Chinese-foreign cooperative education, students are the real consumers of cooperative education, and schools are the suppliers of cooperative education. Student satisfaction is the psychological state of students (customers) after their needs are satisfied, and the judgment of students (customers) on how products and services meet their needs. Student satisfaction is a multidimensional concept, reflecting the subjective experience of students in educational life.

From elite education to mass education, the quality assurance of higher education has shifted from emphasizing the characteristic indexes of colleges to emphasizing the evidence of students' learning outcomes. Student learning outcomes are the knowledge, skills and abilities that students acquire after an educational experience. Direct measurement of learning achievement is not easy to obtain, so students' learning achievement, self-evaluation, satisfaction, graduation rate and post-graduation development can all be used as reference standards for evaluating teaching quality, and these standards can often be used as objective evidence for students to evaluate education. Combined with the research results of foreign scholars and the reality of Chinese-foreign cooperative education in China, the study of the relationship between student satisfaction and learning outcomes will provide a strong basis for the management of Chinese-foreign cooperative education to better serve the teaching and social services, and also provide evidence basis for the evaluation of education quality in Chinese-foreign cooperative education in China.

3.2.3 International interactive participation in Chinese-foreign cooperative educational programs

At present, the research on Chinese-foreign cooperation in running schools mainly includes the motivation and significance of running schools, the status quo of development, as well as the evaluation of service quality and learning outcomes. Few scholars have conducted research on international interactive participation in the context of transnational education. However, in the practice of Chinese-foreign cooperation in running schools, it is the key to improve the quality level and quality of Chinese-foreign cooperation in running schools by introducing talents from

foreign higher education rationally and effectively, which not only alleviates the shortage of high-quality education resources in the process of popularization of higher education in China to a certain extent, but also promotes the reform of higher education in China and improves the international competitiveness of higher education in China. Therefore, it is necessary to strengthen the guiding role of international interactive participation for students. However, there is still a lack of research on how international interactive participation regulates the relationship between service quality and student satisfaction.

In addition, and more importantly, Chinese-foreign cooperative programs are more special than ordinary university study. It requires students to be more involved in the international learning process, which means that international interactive participation also plays a greater role in the project.

3.2.4 Research conceptual model

Therefore, based on SERVQUAL model, research results of students' satisfaction and learning outcomes, research results of Chinese-foreign cooperative education, this thesis studies the influence of perceived service quality on learning outcomes, mediation, international interaction and adjustment of students' satisfaction, reveals the influencing mechanism, and puts forward the following conceptual model.

The independent variable of the research model is the perceived service quality of students in Chinese-foreign cooperative school-running projects. According to SERVQUAL model, the independent variable is composed of five variables: tangibles, reliability, responsiveness, assurance and empathy. Learning outcome is the dependent variable of the research model, satisfaction is the mediating variable, international interactive participation is the moderating variable, and age, gender and other factors are the controlling variable.

The research conceptual model is shown in figure 3.1.

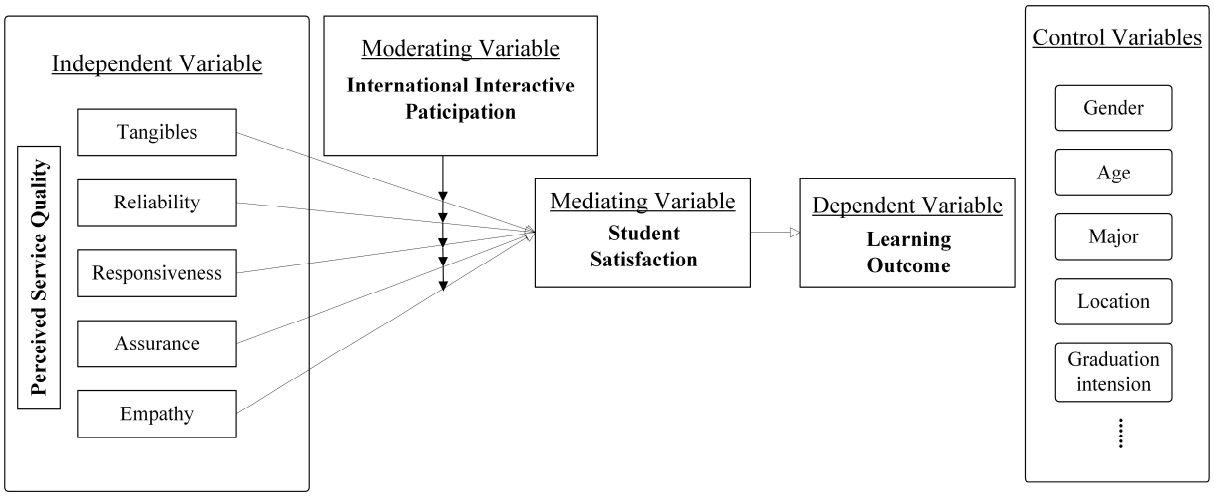


Figure 3.1 Research Model

Perceived service quality as an independent variable is the core of the research, which can affect the dependent variable, learning outcomes. The mediator variable, student satisfaction, is between the independent variable and the dependent variable, which can better understand the relationship between the independent variable and the dependent variable. The moderator variable, international interactive participation, can affect the relationship between the independent variable and the mediator variable, thus better understanding the complexity and diversity of this relationship. Therefore, in the research process, it is necessary to fully consider the complex relationship among the independent variable, mediator variable, and moderator variable in order to better understand the research results and propose research hypotheses.

3.3 Research hypotheses

Research hypotheses are a speculative judgments and hypothetical explanations of the law or cause of the problem under study based on conceptual model and scientific theory, which is a tentative theory envisaged in advance before the research.

3.3.1 Perceiving service quality and learning outcomes.

PZB believed that the total result of a customer's transaction was a function of his or her evaluation of service quality, product quality and price (Parasuraman et al., 1985). The quantity of the gap between customers' perception of service quality and expectations would have an impact on service results. Customers have a choice to vote with their feet (quit) or to remain loyal (retain) after they perceive the service. PZB conceptualized disliking behavioral tendencies as complaints, which were regarded by many researchers as a combination of negative reactions (Zeithaml et al., 1996) . Perceived poor service quality can lead to complaints

from customers, such as seeking compensation from sellers, negative verbal communication, or taking legal action. Customers who perceive poor service quality may not choose to purchase again. Instead, they may take management's time, energy, and resources to complain about what they are being treated with and may further harm the company by discouraging other customers from buying its products.

Chinese-foreign cooperation in running schools is an important part of China's higher education. It is of great significance to evaluate the quality and effect of Chinese-foreign cooperation in running schools for deepening the reform of higher education. As a necessary part of students' learning experience, students' learning result is the final embodiment of the effect of running a university and a key index to measure the quality of education. The meaning of students' learning achievement generally understood by academic circles is: the results obtained by students in knowledge, skills, attitudes and other aspects after a specific form of learning. "Teaching" is a kind of service, and "learning" is the result of service. Obviously, the direct focus of learning-centered teaching evaluation is on the learning of the evaluation object-students. Because students' learning and effectiveness is the ultimate embodiment of teaching quality. Based on this, this thesis proposes the following research hypotheses:

H1: Perceived service quality has a positive impact on learning outcomes.

H1a: Tangibles has a positive impact on learning outcomes.

H1b: Reliability has a positive impact on learning outcomes.

H1c: Responsiveness has a positive impact on learning outcomes.

H1d: Assurance has a positive impact on learning outcomes.

H1e: Empathy has a positive impact on learning outcomes.

3.3.2 The mediating role of student satisfaction

Okun and Weir believed that student satisfaction refers to students' cognitive evaluation of the overall quality of learning and life, which is closely related to students' learning and development (Okun & Weir, 1990). In 2010, Oliver defined customer satisfaction as customers' judgment of whether a product or service can provide pleasant consumption. Later, some scholars introduced this definition into the field of education (Oliver 2014). Luca argued that students are the real consumers of higher education(Petruzzellis et al., 2006). Schools should pay more attention to customer (student) satisfaction, fully consider customer (student) satisfaction and provide effective services according to students' needs and expectations when rebuilding school organization and developing a continuous monitoring system. Therefore, if

colleges and universities can gain high praise from students, they can not only maintain the current satisfaction situation, but also create a better learning environment to attract more new students.

Many studies have shown that evaluating student satisfaction can increase the value of a college education. Student satisfaction leads to better academic performance, better social interaction and greater success after graduation. The study found that if students are satisfied with their academic life, they will feel better later in life, not only in academic performance and personal development, but also later in life. Satisfied students have higher persistence and graduation rates and are more likely to be positive and generous alumni after graduation. Therefore, it is very important to pay attention to student satisfaction for the overall health and vitality of Chinese-foreign cooperative education, and the most efficient method is to systematically measure and evaluate student satisfaction.

Kerlin pointed out in his research on student education support services of Everett Community College in the United States that high quality education services, fast service, staff's knowledge and ability during service and attention to students affect student satisfaction, and student satisfaction will have an impact on students' behavior trend (Kerlin, 2000) It will affect whether a student stays in school, and whether the student makes positive or negative verbal comments about the school. Carrie Leugenia Ham's research confirmed the importance of service quality and improvement for students at Southern Wesleyan University and Western Michigan University (Ham, 2003). It revealed the influence of service quality and student satisfaction on learning outcomes in academic field. Therefore, based on the above analysis, the following hypotheses are proposed:

H2: Student satisfaction plays a mediating role in perceived service quality and learning outcomes, that is, perceived service quality affects learning outcomes through student satisfaction.

H2a: Student satisfaction plays a mediating role in tangibles and learning outcome, that is, tangibles influences learning outcome through student satisfaction.

H2b: Student satisfaction plays a mediating role in reliability and learning outcomes, that is, reliability affects learning outcomes through student satisfaction.

H2c: Student satisfaction plays a mediating role in responsiveness and learning outcome, that is, responsiveness influences learning outcome through student satisfaction.

H2d: Student satisfaction plays a mediating role in assurance and learning outcome, that is, assurance affects learning outcome through student satisfaction.

H2e: Student satisfaction plays a mediating role in empathy and learning outcome, that is,

empathy affects learning outcome through student satisfaction.

3.3.3 The moderating role of international interaction participating

In recent years, a series of empirical studies have been conducted by predecessors on customer participation in the production process of service or product, which will affect the perception of service or product quality and ultimately affect customer satisfaction. Customer satisfaction is the core content of service dominant logic pursuit and the premise of customer participation in the service process. Customer participation behavior can ensure the improvement of service quality, but it also needs the correct guidance of service managers to achieve satisfaction.

The root of customer participation in service lies in the inseparability of production and consumption. Customer participation in service production and delivery, service performance and quality are inseparable from customer contribution, and service results depend on customer participation and cooperation to a considerable extent. With the development of customer's pursuit of individuality and network community, customer participation has become a trend of production and consumption, which reflects the transformation of marketing from product-led logic to service-led logic. From the perspective of the evolution of customer's role in an enterprise, customer participation is not only inevitable but also essential for the development of an enterprise. Encouraging customer participation has become a cutting-edge enterprise competitive strategy. Customer participation is not a new thing, and what effect it brings to both enterprises and customers has become a problem that researchers and managers pay attention to and needs to be explored urgently.

Under the background of Chinese-foreign cooperation in running a school, it is very important for students to interact with foreign institutions as customers. Prior to the provision of services, students' interaction with foreign schools can provide more information to ensure that the education meets their needs. In the process of service, students' international interaction can improve service delivery efficiency, improve learning skills and efficiency, and establish a good relationship with the faculty. At the end of the service, students can effectively feedback the service results and provide suggestions for Chinese-foreign cooperative education. They can also timely complete the negative feedback, take intervention actions and help to find a remedy plan when they are not satisfied. By making full use of foreign high-quality higher education resources, students' perception of Chinese-foreign cooperation in running schools can be improved, thus affecting students' learning satisfaction. Based on this, the following research hypotheses are proposed:

H3: International interaction participation positively moderates the relationship between perceived service quality and learning satisfaction.

H3a: International interaction participation positively moderates the relationship between tangibles and learning satisfaction.

H3b: International interaction participation positively moderates the relationship between reliability and learning satisfaction.

H3c: International interaction participation positively moderates the relationship between responsiveness and learning satisfaction.

H3d: International interaction participation positively moderates the relationship between assurance and learning satisfaction.

H3e: International interaction participation positively moderates the relationship between empathy and learning satisfaction.

According to the research model, these research hypotheses are shown in Figure 3.2.

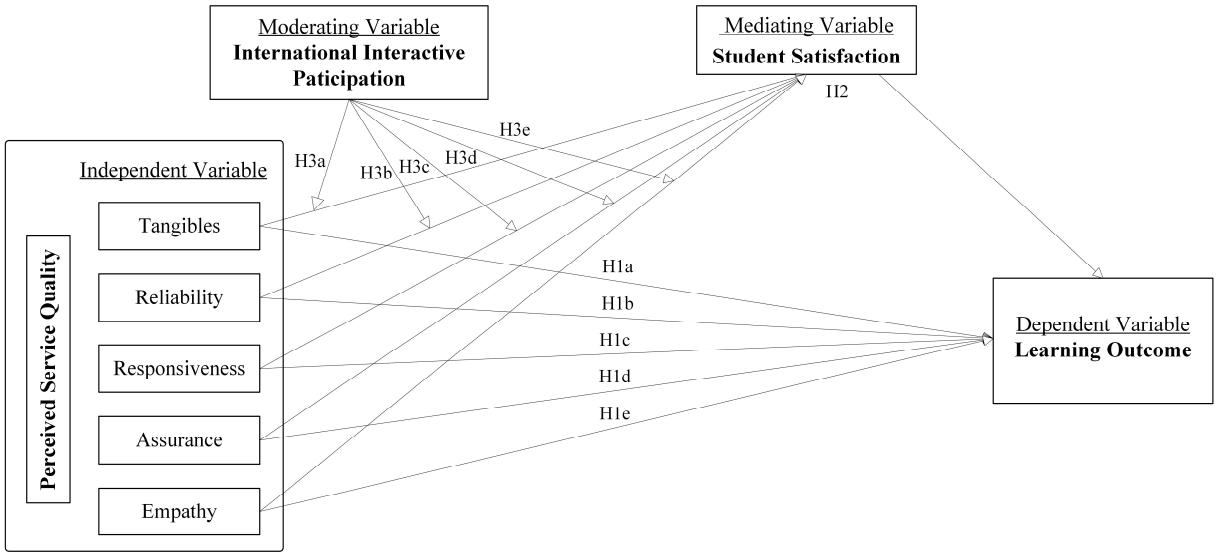


Figure 3.2 Research Hypotheses

3.4 Questionnaire design

Foreign scholars' research on educational service quality proved that SERVQUAL method is suitable for the evaluation of educational service quality. However, education is different from other service industries, which means that in order to evaluate the service quality in the field of education, it is necessary to make appropriate amendments to the SERVQUAL scale of PZB, to convert, modify, add or delete the dimensions and indicators of SERVQUAL in the field of education, and at the same time to re-test the reliability and validity of the scale, so as to avoid blind application or simple transplantation. In view of the above considerations, this thesis

developed a set of questionnaires to evaluate the service quality of Chinese-foreign cooperative education based on PZB's SERVQUAL scale. Following is the development process of this questionnaire.

The basic steps of questionnaire design are shown in the figure 3.3.

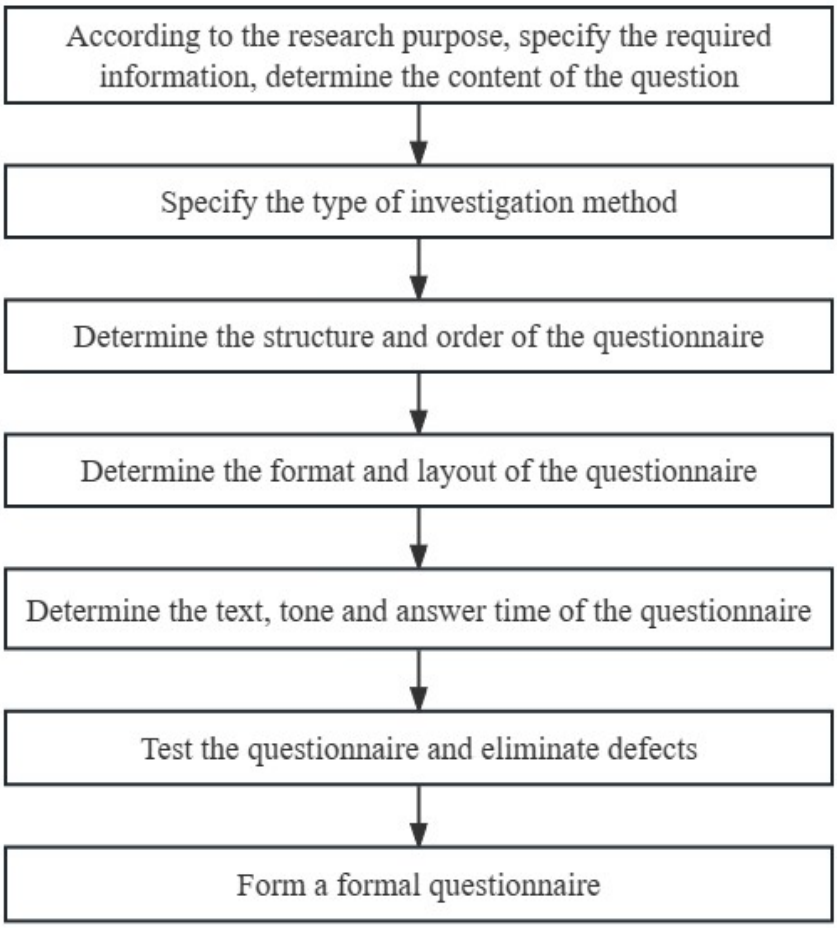


Figure 3.3 Questionnaire Design

3.4.1 Determine the dimensions.

The research purpose leads to the collection of information and the determination of main dimensions.

In the field of education, many researchers have made use of the 5 dimensions and 22 indicators of PZB SERVQUAL scale. Anderson, for example, analyzed the perceived service quality of students in a university from five dimensions based on SERVQUAL model, that is, the dimension of tangibles, responsiveness, assurance, empathy and reliability, and found that the reliability and responsiveness received higher scores, while empathy was low. Kwan and

Hee (1995) revised the SERVQUAL model and conducted empirical analysis on universities in Hong Kong and mainland China, believing that students' evaluation of higher education is influenced by cultural atmosphere and social environment. Kerlin (2000) used 22 indicators of SERVQUAL original scale to study the student education support service of Everett Community College in America. Schwantz (1996) developed 39 indicators according to the five dimensions of SERVQUAL designed by PZB, studied 92 traditional students and 116 non-traditional students at Texas Tech University, and explored the students' views on service quality in higher education institutions. However, only two dimensions, including “tangibles” and “interactive activities”, of the five dimensions received acceptable scores in using SPSS for factor analysis.

The research of the above scholars has one thing in common, that is, they basically take the five dimensions and 22 indicators of service quality of PZB's SERVQUAL method as the prototype, and make appropriate modifications according to the research purpose. The determination process of each dimension will be described in Section 3.5, and the specific details of each index determination will be presented in Section 3.6, Variable Measurement.

3.4.2 Specify the types of investigation methods

Questionnaire refers to a kind of question form used for investigation and statistics. According to the survey methods, there are two types: "self-filling questionnaire" and "visiting questionnaire", the first of which is mostly adopted in China. The form of the self-filling questionnaire needs to be simple and clear, while the cover letter or instructions at the beginning of the questionnaire should be detailed. Considering the purpose, cost and efficiency of the research, the questionnaire of this study adopts a self-filling questionnaire, which is handed over to the students and filled out by the students themselves.

3.4.3 Determine the structure and order of the questions

Questions can be broadly categorized into unstructured questions (open questions) and structured questions (closed questions). Open question means that the respondents are free to answer according to their own ideas without any specific answer. The advantage of this kind of question is that it is flexible and suitable for collecting deeper information, especially for those questions with various possible or potential answers. Moreover, it enables the respondents to fully express their opinions and ideas, which is conducive to the respondents' creativity. Open questions are rather helpful in exploratory research. However, its disadvantages are easily

exposed in large-scale sample surveys. For example, the recording proficiency of investigators during interviews will affect the survey results, and it is also very troublesome and difficult to encode and process information. Closed question refers to the question whose possible answers are designed in advance. A set of alternative answers and fixed answer formats for closed questions are specified, such as single choice, multiple choices, ranking by importance, from which the respondents can choose. The answers to closed questions are standardized, which is conducive to the respondents' understanding and answers to the questions, as well as to the collation of data after the survey. The questions in the questionnaire of this study are mainly closed questions, with a total of 43 questions, and two open questions for collecting students' learning outcomes, which could provide information for countermeasures after data analysis.

The information obtained from the questionnaire can be divided into three categories: basic information, thematic information and identity information. Basic information refers to the basic information of the respondents related to the investigation subject, such as gender, age, education level, education level of parents and other demographic information; thematic information mainly refers to issues related to the substance and details of the investigation subject; identity information refers to name, address and phone number or e-mail address. Many surveys are anonymous, but volunteers can be asked to provide identifying information for rechecking, giving out gifts or keeping in touch with them if necessary. In order, there are several ways: put simple questions first and complex ones later; or put sensitive issues (such as basic information) later; or follow the logical order between the contents of the questions and make sure all questions relating to a particular topic are asked before starting a new topic.

The following methods are adopted to arrange the order of the questions in this questionnaire: thematic information (mainly the first and second questions) is put in the front, and the basic information (the third question) is put in the back. To make the results more authentic, this survey adopts the anonymous method without collection of identity information; the closed questions (question 1 to 3) are put in front and the open question (question 4) is put in back. The advantages of this arrangement are: firstly, there is a logical order between the first and second closed questions, which are easier to answer; secondly, the basic information (the third question) is put behind to avoid students’ vigilance because it contains sensitive private information; while open question (the fourth question), which is harder to answer, is put in the end so that students won’t get tired.

3.4.4 Determine the format and layout of questions and answers

Too many pages of the questionnaire will reduce the questionnaire recovery rate and various technologies must be adopted to cut down the number of pages of it. In order to reduce the questions and pages of the questionnaire and improve the recovery rate, sufficient preliminary preparations for the question have been carried out. At the same time, seven numbers from number 1 to 7 in seven tables represent 7-point Likert Scale, in which the respondents can directly tick. This form is intuitive, clear, effortless and timesaving.

3.4.5 Written expression, tone and answer time of the questionnaire

Try to be cordial, sincere and polite, concise and accurate in the greetings, instructions, basic information, thematic information and other parts of the questionnaire. The main purpose of doing this is to attract the attention of the respondents, eliminate concerns, stimulate the sense of participation, and strive for their active cooperation.

Three small questions have been designed in the pre-survey questionnaire, including the time the respondents took to fill in this questionnaire, the questions they find incomprehensible, and the deficiencies of the questionnaire. The results showed that the questionnaire was filled out within 10 minutes by 28% of the surveyed students, in 10-15 minutes by 63%, and more than 15 minutes by 9%.

3.4.6 Pre-survey for testing questionnaires and eliminating defects

Based on 25 questions in the five dimensions of service quality of the original SERVQUAL scale of PZB, on the education feature and on the object of this research, this thesis designed a set of pre-survey questionnaires on service quality of Chinese-foreign cooperative education projects referring to the literature research and case practice of education service quality and student satisfaction at home and abroad. The preliminary questionnaire is composed of five parts and 43 questions. The first and second part measure the main variables in the model respectively. Among them, questions 1 to 25 in the first part are the indicators that reflect the quality of educational services collected by the focal students. The fifth part measures the questionnaire itself so as to dig problems and modify the questionnaire in time. The pre-survey was completed on March 27st, 2022, during which the sophomores to senior students of Glasgow College were randomly selected and 30 valid questionnaires were collected.

3.5 SERVQUAL model of Chinese-foreign cooperative education project

Up to now, there is no uniform standard on the dimension division of educational service quality of Chinese-foreign cooperation in running universities; moreover, different research objects lead to differences in dimension division, and even the same dimension has different meanings. This thesis specially subdivided and classified the dimension of "Chinese-foreign cooperative education service quality composition" in order to provide a powerful reference for the dimension research of Chinese-foreign cooperative education service quality composition. The specific operation steps adopted are as follows: First, classify the dimensions that express the same or similar meaning in the existing research, and then choose an appropriate dimension name to represent the above-mentioned dimensions. If there is any dimension that can not be merged, its original name can be continued. Secondly, summarize the dimensions of educational service quality in the existing literature, which is a reference selection of the dimensions of service quality of Chinese-foreign cooperation in running universities in this study. The service quality dimension is shown in the table 3.1.

Table 3.1 Summary of service quality dimension

Original dimension	researcher	Summarized dimension
Tangibles Tangibles Tangibles Tangibles Tangibles Tangibles Tangibles Equipment and facilities Support facility service quality Teaching facilities Convenience of facilities Physical facilities	Schwantz (1996); Lampley (1999);Ham (2003); Abdullah (2005);Barnes (2007); Hadikoemoro (2001); Ma (2004);Hong (2007); Luo (2006); Kong (2011); Leblanc and Nguyen (1997); Oliver (1999); Kwan and Hee (1995); Icli and Anil (2014); Z. Hu (2006);	Quality of Tangibles
Reliability Reliability Reliability Reliability Reliability Reliability Reliability	Schwantz (1996); Lampley (1999); Ham (2003); Barnes (2007);Abdullah (2005); M. Lin (2012);Ma (2004); Hong (2007); (Luo, 2006); Z. Hu (2006);Kong (2011);	Quality of reliability
Contact with management personnel Interpersonal interaction guidance Responsiveness	Leblanc and Nguyen (1997); Oliver (1999); Kwan and Hee (1995); Schwantz (1996); Lampley (1999); Ham (2003); Barnes (2007);	Quality of responsiveness

Assurance	M. Lin (2012); Ma (2004); Hong (2007); Luo (2006); Kong (2011); Schwantz (1996); Lampley (1999); Ham (2003); Barnes (2007); M. Lin (2012); Ma (2004); Hong (2007); Luo (2006); Kong (2011); Schwantz (1996); Lampley (1999); Ham (2003); Barnes (2007); M. Lin (2012); Ma (2004); Hong (2007); Luo (2006); Kong (2011); Y. Zhang et al. (2014)	Quality of assurance
Empathy		Quality of empathy

The research is on the study of the service quality of Chinese-foreign cooperative education, therefore the attributes of Chinese-foreign cooperative education service should thus be better reflected. Therefore, this study focused on the general characteristics of services, the characteristics of Chinese-foreign cooperation in running universities, and the ways to embody the quality of educational services, analyzed and summarized the results of expert discussions and qualitative interviews, and finally determined five dimensions of "service quality of Chinese-foreign cooperation in running universities", namely tangibles, reliability, responsiveness, assurance and empathy.

3.5.1 Definition of tangibles

PZB believed that tangibles is the essential characteristic of customer's perception of service quality, which refers to the physical parts that can be perceived by customers in the service process, including tangible tools, equipment, personnel and written materials. All these service providers are intuitive references for customers to evaluate service quality. The essence of tangibles is the visible display part that the service industry pays attention to. Tangible display is a tangible component conveying service features and advantages within the scope of service marketing management. In products, tangible display is basically the product itself, while in services, the scope of tangible display is relatively wide. Tangible quality means the perceivable substantive information presented by colleges and universities through tangible carriers, which mainly focuses on students' learning status and the display of academic related information. The visible dimension of education quality is caused by the invisibility of students' education services, which is mainly reflected in the fact that education services are completed through various activities interacting with students. As a result, students can not identify the education quality in the same way as they treat commodities by directly observing the presented attributes.

At the same time, it is difficult for Chinese-foreign cooperation to publicize the benefits and values brought by the educational service products to students. Therefore, universities should help students perceive the quality of their educational services through visible and tangible displays. In addition, in the process of providing educational services, teachers and management service personnel need to use certain teaching facilities and experimental equipment to complete various activities of educational services. Therefore, in this research, tangibles mainly includes physical environment and information display.

The physical environment refers to the conditions of visible and tangible things that exist objectively in the process of students receiving educational services. There are two conditions included in the physical environment, including teaching conditions, the conditions of teaching resources of hardware and software in classrooms and laboratories, and living conditions, the conditions of living frustrations of accommodation, canteen and sports facilities that guarantee students' normal life.

Information display is the content conveyed to students in the form of words and other forms in the student education service. If it is not in the words or other visible forms, the information would remain unknown to students, just as information display emphasizes. Information display includes information and system of training process, degree discipline and student management and service. The training process includes the policies and regulations, training programs, teaching research, work guides and other information about student training. Degree discipline includes information related to it, such as degree awarding standard, application process, professional information of disciplines, academic norms. Student management and service includes students' ideological and political education, scholarship selection, awards and recognition, and affairs management regulations.

3.5.2 Definition of quality of reliability

Quality of reliability refers to the university's standardized and accurate completion of the stipulated function of the education stage within the specified time and under the specified conditions. Reliability is an important indicator of the service quality of Chinese-foreign cooperative education, which is closely related to the core service. It emphasizes that the university-running institution can provide students with various educational service products in a standardized and accurate manner, so as to convince the students of trustworthy and dependable of the university. From the characteristics of education service, the invisibility of student education service and the simultaneity of production and consumption also call for

accuracy and trust of education service products provided by universities, otherwise irreparable mistakes will be made and the effect of student education will be directly affected. First, the specified time means that there is a clear time limit for each stage during the study period, such as the opening, mid-term, pre-answer and defense of graduation thesis. Secondly, the specified conditions include two aspects, the first of which is the teaching and living conditions provided by the university, and the education service is carried out under the above-mentioned objective conditions; the second aspect is the students' conditions, that is, the student quality. Chinese-foreign cooperative education services mainly focus on knowledge consumption and scientific research and training. In the process of service, students should be highly involved and interactive. Therefore, the students' original knowledge level and foundation are particularly important, which is a factor that must be considered in providing various educational services. Third, the stipulated function of students' education stage refers to various service items promised by the university. From the attribute point of view, it can be divided into training scheme and management service. The training plan stipulates the training methods, credit requirements and curriculum, and the requirements of each link of dissertation research. Students' training plan reflects the commitment of the training unit to students' academic service. The effect of students receiving education service should be consistent with the goal of the promised training plan, and the process of education service should be in line with the items stipulated in the training plan. Teachers should strive to be standardized and accurate in teaching and other aspects. At the same time, the management and service are non-academic services for students. As an important part of student education service, it provides guarantee and foundation for academic service. Students' concerns about overseas study programs, scholarship management, psychological counseling, employment guidance, and life services have become important services provided by Chinese-foreign cooperation in running universities. It is particularly important that both administrative and logistics personnel can handle affairs for students in a standardized and accurate manner, which is also an important link that affects the quality of students' educational services.

3.5.3 Definition of quality of responsiveness

In the research of service quality, quality of responsiveness is a significant factor affecting service quality. Numerous scholars believed that the efficiency of service delivery is an important factor for customers to perceive service quality. Therefore, responsiveness becomes an important dimension of service quality. PZB believed that responsiveness mainly refers to

responsiveness, that is, being ready to provide customers with fast and effective services at any time. Responsiveness emphasizes the timeliness and effect of service.

The responsiveness of Chinese-foreign cooperative education service is different from other service industries. In the service industry, the customer's waiting time is an important reflection of the service quality of an enterprise. However, in the Chinese-foreign cooperative education service, although the waiting time is important, students pay more attention to the effect after the response. For example, when students get timely guidance from teachers, students pay more attention to whether the effect of guidance meets their own needs. Responsiveness refers to the ability and willingness of colleges and universities to respond to students' needs and opinions in a timely and effective manner in the process of providing Chinese-foreign cooperative education services. It emphasizes the timely and effective interaction between Chinese and foreign teachers and management service personnel and students to meet the reasonable needs of students. Responsiveness is mainly service-oriented, and those who provide services for students should establish a sense of service, so as to timely and effectively complete various educational service activities for students. Teaching service activities are high-contact service activities in which students always participate. It can be said that without students' participation, the service activities of universities can not be completed.

Because of the different nature and mode of running a university, the students enrolled by Chinese-foreign cooperatively-run universities are different from those of parent universities: the students enrolled have low college entrance examination scores, come from families with rich economic conditions, have poor self-reliance and self-care ability, poor ability to withstand setbacks and strong self-centered consciousness due to long-term excessive care by parents. Compared with their counterparts in China, students in Chinese-foreign cooperative universities bear the dual pressures of language learning and professional learning at the same study time, and they also must accept and adapt to two different teaching systems, which virtually increases the difficulty of teaching management. In course learning, the quality of interaction between teachers and students in class and after class, and the ability of teachers to make timely responses to the needs of students in course learning show that teachers have the consciousness of serving students and putting the needs and interests of students first. In addition, due to the particularity of students, management and service personnel need to know the needs of students in time, and be able to respond and rectify quickly.

3.5.4 Definition of quality of assurance

Quality of assurance means that the service personnel are qualified and adopt a good service attitude towards customers so as to enhance their confidence and sense of security in the service quality of the enterprise. The good service attitude of service personnel will make customers feel pleased, which will naturally affect customers' subjective feelings, thus affecting customers' evaluation of service quality. With profound professional knowledge and qualified ability, the service personnel will arouse the confidence of customers and delight them with satisfactory service.

In the service of Chinese-foreign cooperation in running universities, assurance is an important reflection of educational service quality. Education is mainly a kind of high-contact service with knowledge as the carrier. The professional knowledge and post competence of the personnel who provide educational services are the basic premise of completing educational services with high quality. Education is accomplished through continuous interaction with students, and the degree of students' participation directly affects the effect of educational services. Therefore, the satisfactory attitude of service providers can arouse the enthusiasm of the students. Assurance refers to the friendly attitude and post competence shown by teachers and management service personnel in the process of providing educational services, which can enhance students' confidence in obtaining a degree. The quality of assurance can strengthen students' confidence and sense of security in the quality of their educational services. Education is a kind of knowledge-based service, which is intangible and its service product is hard to evaluate for students. Chinese-foreign cooperatively-run universities need to enhance students' perception of what they get from education services through some explicit characteristics of the educational service providers. At the same time, as one distinct feature, the simultaneous production and consumption of educational service means that educational service products can not be stored, resold or returned. When students choose the educational service products of a university, they have no right to resell or return them. The university should ensure the effective completion of students' educational service activities through the knowledge level and service attitude of the main producers of educational service products. Based on the above two characteristics of educational service activities, it is necessary for the provider of educational service to have a good attitude and post competence, which is a guarantee for the smooth progress of educational service.

The demand for foreign teachers is increasing with the rapid development of Chinese-foreign cooperation in running universities. However, the institutions concerned have not

established a scientific and reasonable assessment mechanism for imported teachers, which leads to the mixed quality of foreign teachers. In addition, the frequent flow of foreign teachers is not conducive to their accurate grasp of the situation of universities and students, which will easily lead to the problems of unsystematic teaching and lack of continuity. In many Chinese-foreign cooperatively-run universities, Chinese instructors are not well trained. During the initial stage of bilingual teaching, there is a lack of excellent teachers with fluent foreign language expression and solid professional foundation. Therefore, in actual teaching, there are some problems such as Chinese teachers using Chinese instead of bilingual teaching, colleges and universities hiring relevant teachers to teach in foreign universities temporarily, which will not only hinder the progress of teaching quality, but also bring hidden dangers to teaching management. Therefore, teachers' professional knowledge and foreign language level greatly affect the quality of academic training, and the management professional knowledge of management service personnel and their attitude towards students also affect students' perception of the quality of their educational services. It can be seen that improving the level of teachers can reduce the failure of Chinese-foreign cooperative education services.

3.5.5 Definition of quality of empathy

The quality of empathy requires enterprises and service personnel to strive to put themselves in the customer's shoes and meet the customer's requirements. This calls for the devotion spirit of the service personnel to think for customers, know what they really need and meet their specific requirements by all means so as to make the service process full of humanistic care, which is the embodiment of empathy. Empathy emphasizes the degree of emotional involvement of service personnel to customers, their concern and understanding of customers' needs, and their great affinity, so that customers can easily contact service personnel.

In Chinese-foreign cooperation in running universities, the quality of empathy means that in the process of providing various educational services, teachers and management service personnel can understand and care for students from the perspective of students and provide them with humanized services. First, as the evaluation subjects of educational services, students' needs and development should be considered by relevant personnel in colleges and universities to improve their service experience. Second, students, as direct customers of student education services, have their own particularity. Most of the students in Chinese-foreign cooperative universities have excellent family conditions, strong sense of autonomy and diversified individual demands. This particularly requires relevant personnel to provide personalized

attention to students and treat them as independent individuals in the process of educational service. Thirdly, at present, the tutor responsibility system is introduced into the undergraduate training mode of UESTC, which embodies the essence of empathy. The tutor responsibility system requires tutors to systematically master the relevant knowledge of education, construct a perfect educational knowledge system from the perspectives of pedagogy, psychology, sociology and management, enhance their sense of responsibility, learn more about the growth rules and changes of each student, and use full communication and attention to guide the all-round development of different students in academic growth and personality development. The essence of empathy is to make each student feel unique and special by providing personalized educational services for students, and to feel attention and emotional understanding from tutors, teachers and management service personnel.

3.6 Variable measurement

As the object of this study is Chinese-foreign cooperative education projects, the available public research data can not be used to evaluate the variables of service quality and learning results of the current Chinese-foreign cooperative education projects. Therefore, this study uses questionnaires to collect research data, and uses subjective perception to score and measure with 7-point Likert Scale.

In view of the complex phenomenon of educational quality and the narrow concept of single item measurement, a number of heterogeneous items are designed in order to improve the reliability of the research. The design steps are as follows.

First, consult the literature. Collect and read a large number of domestic and foreign literature about various dimensions of service quality and satisfaction, select appropriate scales and design a preliminary questionnaire based on the research questions.

Secondly, expert discussion. After discussion of two professors, comments and suggestions were drawn and revised into the second draft of the questionnaire.

Third, teachers, student and managers interviews. In order to further improve the expression quality of the items, five sophomores, juniors and seniors, three teachers and two managers of Glasgow College were selected to give out suggestions for improvement on the item design, expression and format of the second draft of the questionnaire, and the third draft of the questionnaire was formed.

Fourth: Pre-investigation. A limited number of questionnaires were distributed to 30 students of Glasgow College, the data were collected for statistical analysis, and relevant items

were modified to form the final questionnaire.

Based on the existing literature analysis, this study concludes that the service quality of Chinese-foreign cooperation in running universities consists of five dimensions, namely, tangibles, reliability, assurance, responsiveness and empathy. In the five dimensions, combined with the particularity of Chinese-foreign cooperative education service, the next level index is selected in each dimension.

3.6.1 Quality of tangibles

In the research of educational service quality, scholars believed that the quality of tangible is an indispensable part of educational service. It is through the campus and dormitory environment, the experimental equipment they own, and the publicity of information materials that the students can intuitively feel the quality of educational service. Luo Changfu believed that the tangible quality of educational service quality is the "tangible part" of teaching facilities and settings provided for students, such as the facilities and equipment of the organization and the appearance or behavior of service providers. Schwantz (1996) and Ham (2003) believed that quality of tangibles refers to the physical objects used in the process of offering educational services for students. These objects can be regarded as carriers of educational services, which can help students to intuitively perceive the quality of educational services in colleges and universities. Based on the characteristics of Chinese-foreign cooperative education service, this study defines tangibles as the excellent degree of physical environment and information display in providing education service to students. Physical environment refers to the excellent degree of facilities and equipment used by colleges and universities to provide educational services for students. Information display refers to the comprehensive degree of information provided by colleges and universities to students. Information display emphasizes that information remains unknown to students if no university shows it to students through various channels or ways. Because of the differences in the definition of tangibles in existing studies, the measurement items are different. The following table 3.2 summarizes the tangible measurements used by scholars in the field of education in empirical research.

Table 3.2 Measurement items of tangibles in education field

Author (time)	Items
Schwantz (1996)	1. Modern teaching facilities and equipment. 2. The clean and tidy appearance of faculty and staff. 3. Beautiful campus environment.
Ham (2003)	1. Detailed information display on campus. 2. Advanced facilities in the campus and classrooms. 3. The clean and tidy appearance of faculty and staff.

	4. Beautiful campus environment
Ma (2004)	1. The university has advanced facilities for teaching, living and extracurricular activities. 2. Attractive appearance of university teaching, living and extracurricular activities facilities. 3. Teachers and staff are well dressed and clean. 4. The availability of relevant plans, standards, norms, procedures, requirements and other information in the process of serving students by faculty and staff. 5. The time arrangement of various services provided by the university is convenient for students.
Luo (2006)	1. The university has advanced teaching and research facilities. 2. The faculty and staff are dressed appropriately, neatly and cleanly in the process of serving students.
Kong (2011)	1. It doesn't take much time to find campus information. 2. The dormitory environment is elegant and comfortable. 3. The information and services of the library are abundant. 4.The experimental facilities in the university can meet the needs of students' scientific research.

Based on the measurement items of tangibles by scholars in the table above and the results of qualitative interviews with teachers, students and managers in Glasgow College, this study finally determined that the measurement method of tangibles was multi-dimensional and 7 point Likert Scale, including 8 items.

Measurement Items of Tangibles of Chinese-foreign Cooperative Education Projects:

1. The College has complete and modern teaching equipment
2. The College offers diversified and practical courses and teaching materials
3. The teachers of the College have rich theoretical knowledge and practical experience
4. The College has a perfect counseling service center for further study and employment
5. The College provides relevant policies and regulations, guidelines and other information through various means
6. The College's promotional materials are real, rich and attractive
7. Beautiful College environment
8. The teachers and staff of the College are well dressed, neat and clean

3.6.2 Quality of reliability

In PZB SERVQUAL scale, the quality of reliability is defined as " the ability to fulfill service commitments reliably and accurately." This definition reflects the key attributes of the service, provides a reference point for customers to perceive the service quality, and is also operational for the service measurement. In the environment of postgraduate education service, Luo (2006) believed that the quality of reliability refers to the ability of institutions to provide the promised service reliably and accurately. Y. Liu (2013) thought that quality of reliability is the ability to

instruct the educational service activities to be carried out smoothly and orderly and to achieve the training objectives. The inconsistency of definition also leads to the diversity of reliability concept operation in empirical research. The following table 3.3 summarizes the measurement of reliability quality by scholars in the field of education service at present.

Table 3.3 Measurement items of reliability in the field of education

Author(time)	Items
Lampley (1999)	1. Teachers in charge of various affairs politely solve students' problems. 2. The faculty is credible, reliable and honest. 3. Personnel in charge of learning services provide the support services as promised. 4. The financial aid office can provide the promised services. 5. there is no problem in the records of the university.
Abdullah (2010)	1. The faculty and staff abide by their promises to provide various services. 2. Show sympathy and comfort to students in help solving their problems. 3. The faculty and staff can be trusted. 4. The faculty and staff provide the promised service to the students within the specified time.
Luo (2006)	1. The teacher carefully prepares the teaching content when teaching. 2. Teachers' classroom teaching methods are conducive to students' learning and mastering knowledge. 3. Tutor's guidance on scientific research and papers. 4. Have a high-level and well-structured teaching staff.
G. Zhang and Chen (2011)	1. The depth of the course content. 2. The cutting edge of the course content.

Based on the results of qualitative interviews, this study finally determined that the reliability measurement of Chinese-foreign cooperative education service should adopt the multi-dimensional and 7 point Likert Scale, which includes 5 items.

Measurement items of reliability of Chinese-foreign cooperative education projects:

1. All commitments made by the College to students are fulfilled on time

2. Students in the cooperation program will get as much help as possible when they encounter difficulties.

3. College teachers' evaluation of students is fair and reliable

4. College teachers can be trusted

5. The curriculum of the College is reasonable

3.6.3 Quality of responsiveness

Cronin and Taylor (1992a) thought that responsiveness quality has the greatest influence on service quality among high-contact services. They believed that the quality of responsiveness shows the spontaneity of service personnel to provide customers with fast and effective services. The existing research has shown that the waiting time of customers in service is the key factor affecting perceived service quality. Luo (2006) also confirmed that the quality of

responsiveness is particularly important in postgraduate education service. He defined the quality of responsiveness as the responsiveness of graduate education institutions to students' needs and the rapidity of providing services. Based on the existing definitions, this study defines responsiveness as the rapidity of the ability and willingness to respond to students' needs and opinions in a timely and effective manner in the process of providing educational services for Chinese-foreign joint educational programs. Responsiveness emphasizes the timeliness and effectiveness of responding to students' needs. Timeliness is the degree to which colleges and universities respond to the various needs of students in a timely manner when providing educational services for students; Effectiveness refers to the degree that students perceive to meet their own needs after colleges and universities respond to their various needs. The following table 3.4 summarizes the scholars' measurement of responsiveness.

Table 3.4 Measurement items of responsiveness in education field

Author(time)	Items
Cuthbert (1996)	1. Teachers can respond to students' requests at the first time even though they are busy. 2. Staff are always willing to help students. 3. Teachers and staff always put students' interests in mind. 4. Teachers and staff provide students with prompt and timely services.
Leblanc and Nguyen (1997)	1. Students can be informed of changes in time. 2. Registration is timely and correct. 3. The university can keep accurate records for students.
M. Lin (2012)	1. The reasonable learning requirements expected by students are met quickly and timely. 2. The reasonable life requirements expected by students are met quickly and timely. 3. Teachers, administrators and logistics service personnel of institutions are always willing to explain the students' situation. 4. Teachers, managers and logistics service personnel of institutions can answer students' requests in time no matter how busy they are.
Ma (2004)	1. The reasonable learning and life requirements expected by students can be met quickly and in time. 2. The faculty is always willing to help students. 3. No matter how busy the faculty and staff are, they can answer students' requests in time.

Based on the survey items of responsiveness by scholars in the table above and the results of qualitative interviews with students in Glasgow College, this study finally determines that the survey method of responsiveness is multi-dimensional and 7 point Likert Scale, which includes 4 items.

Measurement items of responsiveness of Chinese-foreign cooperative education projects:

1. The College has channels for students to express their complaints
2. College teachers can respond to students for the first time even when they are busy
3. College staff are always ready to help students

4. The reasonable demands of College students can be met quickly

3.6.4 Quality of assurance

At present, there are great differences in the research of assurance, both in the operational definition of variables and in the measurement of variables. Most of the research is based on the SERVQUAL scale of PZB, which is revised in combination with the research background and problems. In this study, assurance is defined as the degree to which teachers and other faculty members show friendly attitude and post competence in the process of providing various educational services for Chinese-foreign cooperation in running universities, so that students can gain confidence and security.

Friendly attitude is the degree of friendship shown by tutors, teachers and management service personnel in the process of educational service delivery. Post competence is the degree to which instructors, teachers and management service personnel master relatively stable and systematic knowledge within their respective scope. The measurement items of assurance in the field of education are shown in table 3.5. On the basis of assurance measurement by Lampley (1999), Barnes (2007), Y. Zhang et al. (2014) and Luo (2006), combined with the results of qualitative interviews, this study finally determined that the assurance measurement in the student education service environment should adopt the multi-dimensional and 7 point Likert Scale, including 4 items.

Table 3.5 Measurement items of assurance in the field of education

Author(time)	Items
Lampley (1999)	1. Mentors and other academic guidance teachers provide appropriate guidance to meet the degree requirements. 2. The faculty are always polite. 3. Teachers in departments have sufficient knowledge to answer students' questions. 4. Campus security is guaranteed.
Barnes (2007)	1. Teachers have a high academic level. 2. The professor is polite to the students. 3. The teaching staff have enough knowledge and ability to answer students' confusion. 4. Studying and living here is safe and reliable.
Y. Zhang et al. (2014)	1. The enthusiasm of staff and faculty for students. 2. Teachers' teaching and scientific research level. 3. Staff's service consciousness. 4. Teachers' level and academic ability.
Luo (2006)	1. Teachers' words and deeds are trustworthy for students. 2. Faculty and staff treat students enthusiastically. 3. Service awareness of faculty and staff. 4. Teachers' knowledge level. 5. Teachers' professional ethics. 6. Tutor's scientific research ability and guidance level.

7. Business level of managers.

Assurance measurement items of Chinese-foreign cooperative education projects:

1. College staff have high professional ethics
2. College teachers have a high academic level.
3. The College has reasonable rules and regulations and treats all students equally
4. Faculty and staff are always courteous

3.6.5 Quality of empathy

Abdullah (2005) pointed out that in the environment of higher education, quality of empathy means that students can enjoy individualized service, their specific and continuously increased needs can be known and cared successively by colleges and universities and their interests can be kept in the mind of staff and faculty. Luo (2006) defined quality of empathy as the degree of caring for students and knowing their needs to offer personalized service. Y. Zhang et al. (2014) and others believed that empathy includes personalized guidance, understanding of needs, communication with teachers, and managers' awareness. Kong (2011) thought that the quality of empathy refers to the degree of teachers' concern for students and personalized guidance. Although there are some differences in the definition of the quality of empathy among scholars, they all agreed that the students should be treated as independent individuals and emphasized the attention to the diversified needs of students and providing personalized services. Based on the above viewpoints, this study defines the quality of empathy as the degree to which teachers and management service personnel can put themselves in the students' shoes to understand and care for them and provide them with humanized services in the process of providing various educational services. Empathy quality emphasizes the degree of care and understanding for students, the degree of emotional involvement of educational service providers, and the accessibility of service providers to students. The measurement items of empathy in service field are shown in table 3.6.

Table 3.6 Measurement items of empathy in service field

Author(time)	Items
Ham (2003)	1. Teachers and staff give individual care to students. 2. Teachers and staff give students individual attention. 3. Teachers and staff understand the individual needs of students. 4. The staff always put the interests of students in mind. 5. The university provides convenient service hours for students.
Lampley (1999)	1. Teachers give individual care when students need it. 2. Teachers in departments always care about the interests of students. 3. The administrative teachers in universities deal with students' problems in a loving way. 4. University computer equipment is open at the time convenient for

	students. 5. The opening time of library is convenient.
Kong (2011)	1.The tutor is easy-going. 2. The tutor will help to set students' learning goals. 3. The tutor has a high professional level. 4. The tutor have many scientific research topics. 5. The tutor has sufficient funds for scientific research. 6. The tutor gives financial support. 7. The tutor cares about students' study regularly. 8. Students can participate in tutor's research project.
Y. Zhang et al. (2014)	1. The tutor gives a personalized guidance. 2. The tutor gets to know the need of students from other teachers. 3. Students have the chance to communicate with the tutor frequently. 4. Managers have a higher awareness of students' needs.

Based on the results of qualitative interviews with students, this study finally determined that empathy was measured by multi-dimension and Richter scale 7, which included four items.

Measurement items of empathy of Chinese-foreign cooperative education projects:

1. The College gives personalized care to students
2. The service hours of each department of the College are convenient for all students
3. Faculty and students communicate frequently
4. College rules and regulations are humanized.

3.6.6 International interaction participation

A major feature of Chinese-foreign cooperative education projects is the integration of advanced educational concepts of China and foreign countries. Whether foreign education can be effectively integrated and fully absorbed by students serves as an important manifestation of evaluating the quality of Chinese-foreign cooperative education projects. The effective usage of foreign educational resources is mainly up to students, who enjoy strong subjective initiative. The participation of students in Chinese-foreign interaction plays an inspiring role. However, currently, there is no set of variable measures specifically for the international interactive participation of students in Chinese-foreign cooperative education projects. The source of this part of questions mainly came from the brainstorming of teachers and faculty members of Chinese-foreign cooperative education projects, and was formed after discussion by experts and professors.

Measurement items of international interactive participation in Chinese-foreign cooperative education projects:

1. In addition to teaching materials, I often take the initiative to consult English literature and academic materials

2. I often browse the websites of world-renowned universities to learn about their trends

3. In addition to the English courses prescribed by UESTC, I take the initiative to learn English and improve my English communication skills

4. I often communicate directly with foreign teachers in the College

3.6.7 Student satisfaction

Student satisfaction is a key factor in the quality of educational services. Multi-dimensional measurement can better reflect the situation of student satisfaction, which is of great research significance to explore students' subjective evaluation of Chinese-foreign cooperative educational services. Student satisfaction is mainly a continuous state and emotional appeal accumulated by students in educational service activities in many times for a long time. It contains not only cognitive components, that is, the comparison between expectations and achievements; It also includes emotional components, that is, emotional reactions such as happiness and joy after needs are met.

Combined with the characteristics and interviews of Chinese-foreign cooperation in running universities, the questionnaire mainly measures students' cognitive part from three aspects: teaching service, non-teaching service and overall teaching quality. At the same time, the emotional part of students is measured from the perspective of "happiness and pride".

Measurement items of students' satisfaction in Chinese-foreign cooperative education projects:

1. I am very satisfied with the teaching service provided by the college.
2. I am very satisfied with the non-teaching service provided by the college.
3. I am very satisfied with the overall service quality of the college.
4. I feel very happy and proud to study in this project.

3.6.8 Student learning outcome

The popularization of Chinese-foreign cooperative education makes the assurance of “quality” the key point of undergraduate education. At present, the academic definition of learning outcomes can be roughly divided into three categories: First, the "process theory", which holds that learning is the degree to which teachers meet students' needs in the teaching process, and the satisfaction of needs is realized through the teaching process. This part of scholars regard student recognition as the origin of learning outcomes evaluation, and establish the "student-centered" educational evaluation concept to diagnose and improve learning outcomes. Bao et al. (2011); Bai (2014); Wen (2015); the second is "effect theory", which defines learning results

from the aspect of teaching effect, and holds that learning results are the embodiment of teaching effect and a manifestation of educational value. The ultimate embodiment of education quality is to promote the development of students, the main body of education, so that students can be comprehensively trained and comprehensively improved in knowledge, ability and quality. H. Wei and Zhong (2009); Y. Li and Lin (2016). The third is the "objective theory", which defines the degree of conformity of teaching quality objectives, and believes that learning results refer to teaching results, that is, the degree of conformity of changes in students' knowledge, ability and quality with teaching objectives. Education attaches importance to the application and transformation of knowledge, pays attention to the demands and practical needs of the industry, and is committed to cultivating senior professionals with specific professional backgrounds, which plays a new role in the popularization of Chinese-foreign cooperative education F. Gao (2017).

This thesis mainly measures the variables of learning outcomes from the perspective of goals. GPA is a unit of calculation to measure the quantity and quality of students' learning, and a certain number of credits and GPA are taken as the standards for graduation and obtaining degrees. Various educational standards and flexible teaching management systems are implemented. The most direct and objective learning outcome is measured by measuring the student's grade point average.

3.7 Chapter summary

The purpose of this thesis is to investigate the effect of perceived service quality on learning outcomes and the mediating role of learning satisfaction and the moderating role of international interaction participation. The conceptual model has four latent variables: the independent variable is perceived service quality, including tangibles, reliability, responsiveness, assurance and empathy; The dependent variable is learning result; The mediating variable is student satisfaction; The moderating variable is international interaction participation, which plays a moderating role between perceived service quality and student satisfaction.

On the basis of theoretical derivation, a total of 18 research hypotheses are put forward, and the reasons for the establishment of these hypotheses are explained in detail. The research hypothesis can be divided into three categories: perceived service quality and learning outcome, the mediating role of learning satisfaction, and the moderating role of international interaction participation.

This chapter extracts the measurement variables of service quality of Chinese-foreign cooperative education projects perceived by students.

The quality of educational service includes tangibles quality, reliability quality, responsiveness quality, assurance quality and empathy quality. First, among the variables of service quality perceived by students, reliability quality is the core dimension of service quality of Chinese-foreign cooperative education. Tangibles quality refers to the quality of tangible carrier in Chinese-foreign cooperative education service, which includes physical environment and information display. Responsiveness quality emphasizes the timely response and response effect of faculty and staff, which covers the timeliness and effectiveness of response. The quality of assurance emphasizes the faculty's ability to create trust among students, which reflects the friendly attitude and competence. Empathy emphasizes the degree to which the faculty cares about students and observes their emotional involvement. Empathy displays the concerns and accessibility of faculty and staff. Through discussion, this chapter puts forward the hypothesis that students' perception of the service quality of Chinese-foreign cooperative education consists of five dimensions: tangibles, reliability, responsiveness, assurance and empathy, and on this basis, constructs a five-dimensional model of students' perception of the service quality of Chinese-foreign cooperative education.

Second, according to the construction of the conceptual model in Chapter 3, the mediating variable, the moderating variable and the dependent variable are measured respectively. Based on the domestic and foreign literature, a questionnaire with 43 items as the main content is developed and designed. The questionnaire was used to test students at Glasgow University of UESTC on a 7-point Likert Scale.

Chapter 4: Data Analysis

As the object of this study is Chinese-foreign cooperative education projects, we can not get data on the service quality and learning outcomes of all Chinese-foreign cooperative colleges and universities. Therefore, this study uses questionnaires to collect research data. As a cooperative institution between the University of Electronic Science and Technology and the University of Glasgow, Glasgow College of UESTC is a well-known cooperative school in China with all the advanced educational concepts of world-famous universities throughout its professional education. In this thesis, the undergraduate students of Glasgow College of UESTC were given questionnaires. A total of 550 questionnaires were distributed in June, 2022. When the questionnaire was completed, it was collected, counted and posted manually.

4.1 Sample information statistics

All of the 550 questionnaires were distributed and 533 were collected, 504 of which were valid, with an effective recovery rate of 91.6%. The demographic analysis of valid questionnaires is shown in the table 4.1.

Table 4.1 Frequency analysis of demographic variables

Statistical Information		Sample Number	Percentage	Cumulative Percentage
Gender	Male	418	82.94%	82.94%
	Female	86	17.06%	100%
Enrollment Year	2018	30	5.95%	5.95%
	2019	128	25.40%	31.35%
	2020	269	53.37%	84.72%
	2021	77	15.28%	100%
Major	Electronic Engineering	198	39.29%	39.29%
	Communication Engineering	206	40.87%	80.16%
	Microelectronic Engineering	100	19.84%	100%
Graduation Intention	Study Abroad	278	55.16%	55.16%
	Study in China	128	25.40%	80.56%
	Go to Work	5	0.99%	81.55%
	Do not Know	93	18.45%	100%
Location	City	411	81.55%	81.55%
	Township or Rural Area	93	18.45%	100%
Education Level of Parents	Primary and Below	20	3.97%	3.97%
	Junior	90	17.86%	21.83%
	Senior High	149	29.56%	51.39%
	College Degree or Above	245	48.61%	100%

Nation(Minority)	No	391	77.58%	77.58%
	Yes	113	22.42%	100%
One_Child	Yes	353	70.04%	70.04%
	No	151	29.96%	100%
Difference	[0,3]	416	82.54%	82.54%
Between	[4,6]	80	15.87%	98.41%
Admission Score and Entry score	[7,9]	8	1.59%	100%
Sum		504	100%	100%

The results in table 4.1 could reflect the distribution of the respondents in this survey. The frequency analysis results of each variable show that the distribution basically meets the requirements of sampling survey. Among the results of the gender survey, the proportion of males is 82.94%, the proportion of females is 17.06%, and the gender ratio is about 5:1, which is consistent with the gender ratio distribution of all students in Glasgow College of UESTC. In the survey results of enrollment year, students in Grade 2021 accounted for 15.28%, which is 53.37%, 25.40% and 5.95% for students in Grade 2020, Grade 2019 and Grade 2018, respectively. For the results of major, students majoring in electronic engineering, communication engineering and micro-electronic engineering accounted for 39.29%, 40.87% and 19.84% respectively. In the survey of graduation intention, the proportion of students who choose to go abroad for further study is the highest, reaching 55.16%, while the proportion of students who choose employment is the lowest, accounting for only 0.99%. 25.40% of students choose to pursue further studies in China. In addition, some students have not determined their graduation intention, accounting for 18.45%. According to the survey of location, about 81.55% of the students live in cities, while only 18.45% live in towns or villages. In addition, nearly half of the students' parents have a college education or above. According to the statistics of nation and one-child, 22.42% of the students are ethnic minorities, and 70.04% of the students are the only child of their family. According to the difference between admission score and entry score, 82.54% of students are enrolled into Glasgow College with scores 0~3 points higher than the entry score. Only a few students scored 7~9 points higher than entry score, accounting for 1.59%.

4.2 Reliability test of the questionnaire

Reliability Analysis is used to study the consistency of the results obtained when the same questionnaire is used to measure survey objects repeatedly. Cronbach is usually used to test the reliability, which usually takes the value between 0 and 1, and the closer it is to 1, the higher the reliability is. (DeVellis & Thorpe, 2021) believe that Cronbach enjoys the minimum

acceptable value when it is between 0.65 and 0.70, a fairly good value when it is between 0.7 and 0.8 and an excellent value when it is between 0.8 and 0.9. If the coefficient of the subscale is lower than 0.65 or the reliability coefficient of the total scale is lower than 0.8, the scale needs to be revised again. This thesis uses SPSS25.0 software to realize the process of reliability analysis.

4.2.1 Reliability analysis of tangibles

Table 4.2 shows the results of tangible analysis of reliability, which reveals that the overall standardized reliability coefficient in tangibles dimension is 0.922, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0.922. Therefore, the items in the tangible dimension do not need to be adjusted because of their high reliability of the subscale and the fine internal consistency of all items.

Table 4.2 Reliability analysis of tangibles

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q1.The college has complete and modern teaching equipment (expected Service Quality)	91.17	119.408	.588	.610	.916	
Q1.The college has complete and modern teaching equipment (perceived Service Quality).	91.98	112.677	.629	.653	.914	
Q2.The college offers a variety of practical courses and materials(expected Service Quality)	91.20	119.168	.568	.629	.916	.922
Q2.The college offers a variety of practical courses and materials(perceived Service Quality)	92.15	111.735	.639	.658	.914	
Q3.The teachers of the college have rich theoretical knowledge and practical experience(expected Service Quality).	91.17	119.119	.583	.615	.916	
Q4.The college has a perfect counseling service center for further study and employment (expected Service Quality).	91.21	118.717	.558	.649	.916	
Q4.The The college has a perfect counseling service center for further study and employment (perceived Service Quality).	91.76	112.129	.677	.591	.913	

Q5.The college provides relevant policies and regulations, guidelines and other information through various means(expected Service Quality) through various means.	91.20	118.801	.594	.624	.915
Q5.The college provides relevant policies and regulations, guidelines and other information through various means (perceived Service Quality) in various ways.	91.77	111.035	.690	.654	.912
Q6.The college's promotional materials are real, rich and attractive (expected Service Quality)	91.25	117.908	.617	.668	.915
Q6.The college's promotional materials are real, rich and attractive (perceived Service Quality)	92.01	109.598	.714	.669	.911
Q7.Beautiful college environment (expected Service Quality)	91.20	118.318	.589	.663	.915
Q7.Beautiful college environment (perceived Service Quality)	91.70	111.869	.680	.692	.913
Q8.The teachers and staff of the college dress appropriately and are clean and tidy (expected Service Quality).	91.19	119.085	.553	.617	.916
Q8.The teachers and staff of the college dress appropriately and are clean and tidy (perceived Service Quality	91.45	114.976	.632	.600	.914

5.2.2 Reliability analysis of reliability

Table 4.3 shows the results of reliability analysis. It can be seen from the table that the overall standardized reliability coefficient in the Reliability dimension is 0.885, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0.885. Therefore, the questions of Reliability dimension do not need to be adjusted because of its high reliability of the subscale and the fine internal consistency of all items.

Table 4.3 Reliability analysis of reliability

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q9.All commitments made by the college to students are fulfilled on time (expected Service Quality)	54.57	52.453	.568	.644	.864	
Q9.All commitments made by the college to students are fulfilled on time(perceived Service Quality)	55.26	46.596	.662	.648	.855	
Q10. The program will try its best to help students solve problems when they encounter difficulties (expected Service Quality).	54.61	52.434	.558	.720	.864	
Q10. The program will try its best to help students solve problems when they encounter difficulties (perceived Service Quality).	55.25	45.746	.730	.723	.848	
Q11.College teachers' evaluation of students is fair and reliable (expected Service Quality).	54.55	52.327	.578	.770	.863	.885
Q11.College teachers' evaluation of students is fair and reliable (perceived Service Quality).	55.29	45.798	.686	.672	.852	
Q12.College teachers can be trusted(expected Service Quality)	54.57	52.384	.558	.746	.864	
Q12.College teachers can be trusted(perceived Service Quality)	55.23	46.570	.679	.615	.853	
Q13.The curriculum of the college is reasonable (expected Service Quality)	54.61	53.073	.474	.568	.869	
Q13.The curriculum of the college is reasonable (perceived Service Quality)	55.84	44.424	.577	.495	.869	

4.2.3 Reliability analysis of responsiveness

Table 4.4 shows the results of reliability analysis of Responsiveness, which reveals that the overall standardized reliability coefficient in dimension of Responsiveness is 0.843, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0.843. Therefore, the questions of Responsiveness do not need to be adjusted because of its high reliability of the subscale and the fine internal consistency of all items.

Table 4.4 Reliability analysis of responsiveness

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q14.The college has a channel for students to express their complaints (expected Service Quality)	41.64	38.783	.473	.431	.831	
Q14.The college has a channel for students to express their complaints (perceived Service Quality	42.49	33.177	.572	.496	.821	
Q15College teachers can respond to students in the first time even when they are busy (expected Service Quality)	41.82	37.682	.494	.606	.829	
Q15.College teachers can respond to students in the first time even when they are busy (perceived Service Quality) even when they are busy.	42.47	32.305	.620	.649	.814	.843
Q16.College staff are always ready to help students (expected Service Quality)	41.78	37.490	.527	.629	.825	
Q16.College staff are always ready to help students (expected Service Quality)	42.23	33.006	.696	.636	.802	
Q17.The reasonable demands of college students can be met quickly (expected Service Quality	41.81	37.024	.534	.620	.824	
Q17.The reasonable demands of college students can be met quickly (perceived Service Quality	42.42	31.839	.672	.658	.805	

4.2.4 Reliability analysis of assurance

Table 4.5 shows the results of reliability analysis of Assurance, which reveals that the overall standardized reliability coefficient in the Assurance dimension is 0.888, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0.888. Therefore, there is no need to adjust the items in the Assurance dimension because of their high reliability of the subscale and the fine internal consistency of all items.

Table 4.5 Reliability analysis of assurance

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q18.The professional ethics of faculty and staff are high (expected Service Quality	43.79	32.352	.638	.668	.871	
Q18.The professional ethics of faculty and staff are high (perceived Service Quality).	44.14	29.494	.705	.641	.863	
Q19.The academic level of the faculty is high (expected Service Quality)	43.84	32.241	.627	.736	.871	
Q19.The academic level of the faculty is high (perceived Service Quality)	44.18	29.968	.658	.616	.869	
Q20.The college has reasonable rules and regulations and treats all students equally (expected Service Quality)	43.78	32.659	.652	.748	.870	.888
Q20.The college has reasonable rules and regulations and treats all students equally (perceived Service Quality)	44.21	29.667	.646	.600	.871	
Q21.Faculty and staff are always courteous (expected Service Quality)	43.76	32.399	.650	.706	.870	
Q21. Faculty and staff are always courteous (perceived Service Quality)	44.08	30.123	.676	.581	.866	

4.2.5 Reliability analysis of empathy

Table 4.6 shows the results of reliability analysis of Empathy, which reveals that the overall standardized reliability coefficient in Empathy dimension is 0.860, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0.860. Therefore, the questions of empathetic dimension need not be adjusted because of its high reliability of the subscale and the fine internal consistency of all items.

Table 4.6 Reliability analysis of empathy

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q22. The College gives personalized care to students (expected Service Quality)	41.90	39.783	.580	.702	.844	
Q22. The College gives personalized care to students (perceived Service Quality)	42.49	35.499	.684	.631	.831	
Q23. The service hours of each department of the College are convenient for all students(expected Service Quality)	41.94	39.989	.581	.727	.844	
Q23. The service hours of each department of the College are convenient for all students(perceived Service Quality)	42.51	35.626	.692	.703	.830	.860
Q24. Faculty and students communicate frequently (expected Service Quality)	41.92	39.397	.634	.694	.839	
Q24. Faculty and students communicate frequently(perceived Service Quality)	42.44	36.040	.669	.649	.833	
Q25. College rules and regulations are humane (expected Service Quality)	41.88	42.585	.421	.396	.859	
Q25. College rules and regulations are humane (perceived Service Quality)	42.53	37.208	.576	.520	.845	

4.2.6 Reliability analysis of inter-participation

Table 4.7 shows the results of reliability analysis of Inter-participation, which demonstrates that the standardized reliability coefficient of international interactive participation is 0.865, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0.865. Therefore, the questions of international interactive participation do not need to be adjusted because of its high reliability of the subscale and the fine internal consistency of all items.

Table 4.7 Reliability analysis of inter-participation

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q1. In addition to teaching materials, I often take the initiative to consult English literature and Academic materials	14.23	21.076	.733	.546	.819	.865
Q2. I often browse the websites of world-renowned universities to learn about their trends	14.45	20.105	.736	.556	.817	
Q3. In addition to the English courses prescribed by the school, I took the initiative to learn English and improve my English communication skills	14.05	22.023	.675	.473	.842	
Q4. I often communicate directly with foreign teachers in the college	14.49	20.282	.711	.521	.828	

4.2.7 Reliability analysis of student satisfaction

According to the reliability analysis results of student satisfaction in Table 4.8, the standardized reliability coefficient of student satisfaction is 0. 937, which is greater than 0.65. The reliability coefficients of deleted items are all less than 0. 937. Therefore, the questions of students' satisfaction need not be adjusted considering its high reliability of the subscale and the fine internal consistency of all items.

Table 4.8 Reliability analysis of student satisfaction

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected item-total correlations（CITCs）	Squared multiple correlations	Cronbach if Item Deleted	Cronbach's Alpha Based on Standardized Items
Q1. In addition to teaching materials, I often take the initiative to consult English literature and Academic materials	16.30	14.837	.850	.730	.916	.937

Q2. I often browse the websites of world-renowned universities to learn about their trends	16.08	15.577	.846	.719	.918
Q3. In addition to the English courses prescribed by the school, I took the initiative to learn English and improve my English communication skills	15.96	15.466	.878	.770	.908
Q4. I often communicate directly with foreign teachers in the college	15.98	15.375	.825	.688	.924

4.2.8 Reliability analysis of total scale

The reliability analysis of table 4.9 presents that the Cronbach's Alpha Based on Standardized Items designed in this thesis is 0.970, which is greater than 0.8. Based on the above data, it can basically be concluded that this questionnaire enjoys good reliability, and the overall reliability of the questionnaire is high.

Table 4.9 Reliability analysis of total scale

Dimension	Index number	Cronbach	Cronbach's Alpha Based on Standardized Item
Tangibles	16	.919	.922
Reliability	10	.873	.885
Responsiveness	8	.839	.843
Assurance	8	.883	.888
Empathy	8	.858	.860
Inter-participation	4	.864	.865
Student Satisfaction	4	.936	.937
Total Scale	58	.968	.970

4.3 Validity test of the questionnaire

The validity test of the questionnaire is used to study whether the item design is appropriate, that is, whether the questions designed by the researcher are scientific or whether the variables

involved in the item are appropriate. On the basis of a large amount of literature research, this thesis divides the validity test into content validity and structural validity. The specific inspection is as follows.

As far as the content validity test is concerned, the measurement questionnaire used in this thesis is designed based on the maturity scale, and experts in related fields are invited to consult and design the questionnaire content to determine the first draft of the scale. Then, under the advice of tutors and related experts, the part of the questionnaire that may have semantic ambiguity and incomprehensible content is designed and revised. Therefore, the questionnaire has satisfactory content validity.

As far as the structural validity test is concerned, this study uses factor analysis to test the validity of the questionnaire items. Firstly, this thesis tests KMO and Bartlett. For KMO test, if the value of KMO test is greater than 0.9, it is suitable for factor analysis, and when its value is lower than 0.5, it should be discarded. If the KMO value test is passed, there is correlation between item variables and the factor analysis can be carried out. For Bartlett's test, if its significance is less than 0.05 or 0.01, the original hypothesis will be rejected, which means that factor analysis can be done. If the original hypothesis is not rejected, these variables may provide some information independently, which is not suitable for factor analysis. With the help of SPSS25.0, KMO and Bartlett tests are conducted in this thesis, and the test results are shown in Table 4.10.

The following table 4.10 shows that the coefficient of KMO test is 0.953, which is greater than 0.9. The significance of spherical test is less than 0.005, which indicates that the original hypothesis should be rejected, indicating that the questionnaire enjoys structural validity and the data of the questionnaire is suitable for factor analysis.

Table 4.10 KOM and Bartlett's test of sphericity

Sampling Suitability of KMO		0.953
Bartlett's Test of Sphericity	Approximate Chi-square	27032.435
	Degree of Freedom	1653
	Degree of Significance	.000

On the basis of determining the suitability of factor analysis, seven common factors are extracted from 25 indicators that constitute the Service Quality of Chinese-foreign cooperative education by principal component analysis, and their characteristic values are all above 1, with a cumulative contribution rate of 71.676%. The common factors have good explanatory power, and the questionnaire evaluation indicators and dimensions are designed reasonably. The result is shown in table 4.11.

Table 4.11 Principal component analysis results

	Initial Eigenvalue			Extraction Sums of Squared Loadings			Rotation Sums Squared Loadings		
Component	Sum	Variance Percentage	Cumulative Percentage	Sum	Variance Percentage	Cumulative Percentage	Sum	Variance Percentage	Cumulative Percentage
1	19.279	38.559	38.559	19.279	38.559	38.559	10.013	20.026	20.026
2	8.209	16.419	54.977	8.209	16.419	54.977	8.388	16.776	36.802
3	3.242	6.484	61.461	3.242	6.484	61.461	7.422	14.843	51.645
4	1.631	3.261	64.723	1.631	3.261	64.723	5.009	10.017	61.662
5	1.281	2.562	67.284	1.281	2.562	67.284	2.074	4.148	65.810
6	1.141	2.282	69.566	1.141	2.282	69.566	1.768	3.535	69.346
7	1.055	2.110	71.676	1.055	2.110	71.676	1.165	2.330	71.676

Extraction method: principal component analysis (PCA)

4.4 Difference analysis of service quality

In this thesis, the service expectation and service perception of each dimension of Chinese-foreign cooperative education Service Quality are paired. According to the basic principle and the evaluation method of SERVQUAL model, students' expectation of Chinese-foreign cooperative education Service Quality is expressed by, their actual perceived score is expressed by, and the difference of Service Quality obtained by subtracting perceived score from expected score is expressed by. After calculation, the expected Service Quality and perceived Service Quality of each dimension and the Service Quality difference under each dimension are obtained. The paired T-test was conducted by SPSS25.0 to test whether there is a significant difference between service perception and service expectation. If the significance level is less than 0.05, the original assumption is not valid, and the actual perceived Service Quality is significantly different from the psychological expectation.

As can be seen from Table 4.12, students' service expectations for the five dimensions of Service Quality of Chinese-foreign cooperative education are all between 6.33 and 6.51, which indicates that students' expectations for Service Quality are at a high level. At the same time, the standard deviation of expected Service Quality in each dimension is less than 1, which indicates that students' expected Service Quality level is consistent, and students have high expectations for the subdivision indicators in each dimension. In terms of perceived Service Quality, students' perceived Service Quality of the five dimensions of Chinese-foreign cooperative education Service Quality range from 5.69 to 6.11, and the standard deviation is basically greater than 1, which indicates that students' perceived Service Quality is quite different, and the questionnaire data has certain universality and representative significance. In terms of Service Quality difference, the P-value of each dimension Service Quality difference

is less than 0.05, so the average value of the two groups is statistically significant. The Service Quality difference of the five dimensions is all positive. That is to say, the expected Service Quality level is significantly higher than the perceived Service Quality level, and the actual experience of students in educational services has not reached their expectation, showing opportunities for enhancement in this Chinese-foreign cooperative education program. In addition, there are significant differences between students' views and expectations in five dimensions. This is the same conclusion as the study by Legčević (2010) and Wong and Sultan (2021),which shows the phenomenon of weak service consciousness, backward management system and low quality of education in colleges and universities has still not been improved (X. Li, 2009). After further analysis, it is found that the five dimensions of Service Quality in descending order are Reliability, Responsiveness, Tangibles, Empathy, and Assurance. The biggest difference between students' expected Service Quality and students' perceived Service Quality is in the "Reliability" dimension, which takes the value of 0.7929. On the " Assurance" dimension, the difference between the Service Quality expected by students and the Service Quality perceived by students is the smallest, which is 0.36012. However, the study of service quality in higher education by Yusof et al. (2012) found that the dimensions with the largest and smallest gaps were Tangible and Assurance, respectively. This illustrates the characteristics of Service quality of Chinese-foreign cooperation in running schools. In contrast to regular schools, students in Chinese-foreign cooperative schools have higher expectations of Reliability and low perceptions of Reliability.

Table 4.12 Five dimensions of service quality difference

Dimension	Expected Service (E)		Perception Service(P)		The Difference Between Expected Service and Perceived Service (Q = E-P)					
	Mean	standard deviation	Mean	standard deviation	Mean	standard deviation	Standard Error of the Mean	T	degree of freedom	Sig. (2-tailed)
Tangibles	6.41369	.703710	5.78795	.978594	.625744	.929401	.041399	15.115	503	.000
Reliability	6.505	.7371	5.712	1.1536	.7929	1.1633	.0518	15.301	503	.000
Responsiveness	6.3318	.84885	5.6915	1.22243	.64038	1.27437	.05676	11.281	503	.000
Assurance	6.4618	.83291	6.1017	1.04446	.36012	1.03494	.04610	7.812	503	.000
Empathy	6.355	.8654	5.825	1.1405	.5302	1.1515	.0513	10.337	503	.000

After further analysis, the Service Quality difference under each indicator in each dimension is obtained, as shown in Table 4.13. Among them, only the average Service Quality difference of Q13 indicator under the reliability dimension is greater than 1.0, which is far from the difference of other indicator, that is, the difference between students' expected Service Quality and students' perceived Service Quality is the biggest under this indicator. Besides, the

average Service Quality difference under Q1, Q2, and Q14 indicators is greater than 0.8.Therefore, Chinese-foreign cooperatively-run universities (or colleges) should consider introducing more advanced modern teaching equipment on the basis of the original teaching software and hardware and management level, and provide students with richer and more diverse courses and learning materials, so as to improve students' perceived Service Quality under Q1 and Q2 indicators; It is necessary to listen to the opinions of students and establish channels for students to express their demands to improve the Service Quality of indicator 14 perceived by students; Last but not least, due to the huge difference of Reliability and Q13 indicator under Reliability, Chinese-foreign cooperation in running schools should adjust the curriculum plan, build a scientific and reasonable curriculum system, pay attention to cultivating students' good scientific and humanistic qualities, so as to effectively accomplish the teaching tasks of various disciplines. The results are helpful for scholars and managers to allocate their resources accordingly.

Table 4.13 Service quality difference under 25 indicators

Dimension	Indicator	Mean	Standard Deviation	Standard Error of the Mean	T	Degree of Freedom	Sig. (2-tailed)
Tangibles	Q1	0.806	1.201	.053	15.064	503	.000
	Q2	0.954	1.269	.057	16.884	503	.000
	Q3	0.613	1.262	.056	10.903	503	.000
	Q4	0.550	1.212	.054	10.181	503	.000
	Q5	0.565	1.248	.056	10.170	503	.000
Reliability	Q6	0.754	1.273	.057	13.294	503	.000
	Q7	0.500	1.261	.056	8.901	503	.000
	Q8	0.264	1.151	.051	5.149	503	.000
	Q9	0.698	1.277	.057	12.279	503	.000
	Q10	0.641	1.274	.057	11.296	503	.000
	Q11	0.740	1.376	.061	12.071	503	.000
	Q12	0.655	1.304	.058	11.268	503	.000
	Q13	1.230	1.770	.079	15.606	503	.000
Responsiveness	Q14	0.843	1.511	.067	12.528	503	.000
	Q15	0.645	1.662	.074	8.710	503	.000
	Q16	0.456	1.387	.062	7.389	503	.000
	Q17	0.617	1.549	.069	8.942	503	.000
Assurance	Q18	0.345	1.183	.053	6.552	503	.000
	Q19	0.349	1.291	.058	6.072	503	.000
	Q20	0.423	1.274	.057	7.445	503	.000
	Q21	0.323	1.183	.053	6.136	503	.000
Empathy	Q22	0.589	1.469	.065	9.004	503	.000
	Q23	0.562	1.498	.067	8.417	503	.000
	Q24	0.524	1.428	.064	8.235	503	.000
	Q25	0.653	1.438	.064	10.191	503	.000

4.5 Correlation analysis and regression analysis

In order to further understand the relationship between variables, this thesis carries out correlation and regression analysis.

4.5.1 Correlation analysis

In order to eliminate the multicollinearity among variables, Pearson correlation test is conducted for all variables in this thesis and the results are shown in Table 4.14.

Table 4.14 Correlation analysis results

	Outcome	Service Quality	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Gender
Outcome	1.000							
Service Quality	0.347***	1.000						
Tangibles	0.301***	0.792***	1.000					
Reliability	0.292***	0.841***	0.680***	1.000				
Responsiveness	0.315***	0.888***	0.611***	0.693***	1.000			
Assurance	0.265***	0.846***	0.541***	0.596***	0.703***	1.000		
Empathy	0.301***	0.872***	0.600***	0.599***	0.718***	0.756***	1.000	
Gender	0.140***	-0.050	-0.066	-0.042	-0.041	-0.032	-0.038	1.000
Grade	-0.158***	-0.019	0.039	-0.091**	-0.017	-0.023	0.021	-0.103**
Major	0.028	-0.033	-0.048	-0.036	-0.001	-0.027	-0.035	0.090**
Graduation intention	-0.160***	0.054	0.088**	0.018	0.043	0.047	0.044	-0.005
Location	0.241***	-0.149***	-0.134***	-0.092**	-0.117***	-0.140***	-0.154***	0.066
Education	0.336***	-0.086*	-0.071	-0.048	-0.092**	-0.046	-0.102**	0.116***
Nation	-0.119***	0.084*	0.066	0.017	0.114**	0.070	0.085*	-0.079*
One_child	0.279***	-0.188***	-0.128***	-0.148***	-0.175***	-0.179***	-0.164***	0.089**
Score	0.396***	-0.208***	-0.125***	-0.157***	-0.216***	-0.184***	-0.188***	0.087*
	Age	Major	Graduation intention	Location	Education	Nation	One_child	Score
Grade	1.000							
Major	-0.151***	1.000						

Graduation intention	0.059	-0.147***	1.000					
Location	-0.136***	0.054	-0.032	1.000				
Eudcation	-0.075*	-0.014	0.004	0.118***	1.000			
Nation	0.129***	-0.019	0.078*	-0.247***	-0.004	1.000		
One_child	-0.119***	0.085*	-0.019	0.203***	0.130***	-0.261***	1.000	
Score	-0.053	0.056	-0.003	0.181***	0.170***	-0.054	0.161***	1.000

The results of correlation analysis show that there is a significant correlation between the learning achievement and the Service Quality under the five indicators (Tangibles, Reliability, Responsiveness, Assurance, and Empathy), as well as variables such as gender, enrollment year, graduation intention, location, education of parents, nationality, difference between admission score and entry score. Among them, the Service Quality and its five-dimensional indicators (Tangibles, Reliability, Responsiveness, Assurance, and Empathy) have significant positive effects on learning outcomes, which is consistent with the research results of K. Hu (2009) for a certain university. However, since Pearson relation matrix does not control other variables, it can not directly prove the simple linear relationship between them. For other variables, the coefficient can reflect the rationality of them. If the graduation intention is obvious, parents' education level is high, and the difference between admission score and entry score is large, students' academic performance will be higher.

Although the correlation coefficient between the difference of Service Quality and its five-dimensional index exceeds 0.5, the multicollinearity between independent variables is not considered because all the above are independent variables, which will not exist in the same model testing. The correlation coefficients of other variables are far lower than 0.5. Therefore, the possibility of serious multicollinearity among the indexes used in this thesis is ruled out so that the next regression analysis can be carried out.

4.5.2 Benchmark regression

In order to further study the influence of Service Quality of Chinese-foreign cooperative education on students' academic performance, this study takes the learning result as the dependent variable and the education Service Quality as the independent variable to construct regression models. The software Stata/SE15.0 is used for this purpose.

When analyzing the influence of the Service Quality between Chinese and foreign cooperatively-run universities on students' learning achievement, this thesis adopts multiple linear regression method of OLS for empirical analysis considering that the dependent variable's learning achievement is a continuous variable with values ranging from 0 to 4.

According to the hypothesis H1 and H1a-H1e in Chapter 3, the benchmark regression

models are constructed, i.e. Equations 4.1-4.7. Models 1-7 correspond to Equations 4.1-4.7 one by one. Only control variables are included in Model 1(see Equation 4.1), while explanatory variable “Service Quality” are added in Model 2 (see Equation 4.2) on the basis of Model 1. Models 3-7 (see Equation 4.3-4.7) added five dimensions of Service Quality, such as Tangibles, Reliability, Responsiveness, Assurance and Empathy respectively, on the basis of Model 1. These models estimate the direct impact of the Service Quality of Chinese-foreign cooperative education and its five dimensions on students' academic performance to verify hypotheses H1 and H1a-H1e.The regression results obtained are shown in Table 4.15.

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} + \boldsymbol{\alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.1}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1\ ServiceQuality} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} \\ &+ \boldsymbol{\alpha_4 Major} + \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} \\ &+ \boldsymbol{\alpha_7 Education} + \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.2}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1\ Tangibility} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} + \boldsymbol{\alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.3}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1\ Reliability} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} + \boldsymbol{\alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.4}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1\ Reactivity} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} + \boldsymbol{\alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.5}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1\ Assurance} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} + \boldsymbol{\alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.6}$$

$$
\begin{aligned}
&\boldsymbol{LearningOutcome} \\
&\quad = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\,\boldsymbol{Empathy} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\
&\quad + \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} \\
&\quad + \boldsymbol{\alpha_7 Education} + \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} \\
&\quad + \boldsymbol{\varepsilon}
\end{aligned}
\tag{4.7}
$$

Table 4.15 Benchmark regression results

VARIABLES	Model 1 Outcome	Model 2 Outcome	Model 3 Outcome	Model 4 Outcome	Model 5 Outcome	Model 6 Outcome	Model 7 Outcome
Service Quality		0.120***					
		(0.021)					
Tangibles			0.108***				
			(0.021)				
Reliability				0.093***			
				(0.017)			
Responsiveness					0.077***		
					(0.016)		
Assurance						0.079***	
						(0.019)	
Empathy							0.075***
							(0.016)
Gender(female)	0.076	0.072	0.068	0.071	0.074	0.074	0.075
	(0.053)	(0.051)	(0.051)	(0.051)	(0.051)	(0.052)	(0.051)
Grade(Sophomore)	-0.234**	-0.190*	-0.192*	-0.174*	-0.198*	-0.227**	-0.217*
	(0.089)	(0.086)	(0.087)	(0.087)	(0.087)	(0.088)	(0.087)
Grade(Junior)	-0.246**	-0.221**	-0.208*	-0.226**	-0.227**	-0.241**	-0.234**
	(0.085)	(0.082)	(0.083)	(0.083)	(0.083)	(0.084)	(0.083)
Grade(Senior)	-0.271**	-0.267**	-0.253**	-0.271**	-0.265**	-0.285**	-0.264**
	(0.097)	(0.094)	(0.095)	(0.094)	(0.095)	(0.096)	(0.095)
Major(Communication)	-0.029	-0.029	-0.040	-0.028	-0.026	-0.028	-0.025
	(0.046)	(0.045)	(0.045)	(0.045)	(0.045)	(0.046)	(0.045)
Major(Microelectronic)	-0.055	-0.063	-0.064	-0.067	-0.052	-0.061	-0.061
	(0.056)	(0.054)	(0.055)	(0.054)	(0.055)	(0.055)	(0.055)
Graduation intention (Study in China)	-0.071	-0.086^	-0.072	-0.076^	-0.085^	-0.080^	-0.089^
	(0.047)	(0.046)	(0.046)	(0.046)	(0.046)	(0.047)	(0.047)
Graduation intention (Work)	-0.008	0.032	0.006	0.032	0.030	0.004	0.027
	(0.198)	(0.192)	(0.193)	(0.192)	(0.194)	(0.195)	(0.194)
Graduation intention (Do not know)	-0.216***	-0.200***	-0.196***	-0.210***	-0.205***	-0.206***	-0.205***
	(0.053)	(0.051)	(0.052)	(0.051)	(0.052)	(0.052)	(0.052)

Location(City)	0.142**	0.117*	0.119*	0.125*	0.131*	0.125*	0.120*
	(0.053)	(0.051)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)
Education(Junior)	0.069	0.096	0.101	0.124	0.089	0.065	0.072
	(0.108)	(0.105)	(0.105)	(0.105)	(0.106)	(0.106)	(0.106)
Education(Senior)	0.201^	0.235*	0.229*	0.251*	0.229*	0.217*	0.206*
	(0.104)	(0.101)	(0.101)	(0.101)	(0.102)	(0.102)	(0.102)
Education(College)	0.365***	0.380***	0.382***	0.405***	0.374***	0.368***	0.358***
	(0.102)	(0.099)	(0.100)	(0.100)	(0.100)	(0.101)	(0.100)
Nation(Minority)	-0.007	-0.001	-0.005	-0.014	0.009	-0.005	-0.000
	(0.050)	(0.048)	(0.048)	(0.048)	(0.049)	(0.049)	(0.049)
One_child(Yes)	0.174***	0.140**	0.156***	0.146***	0.149***	0.148***	0.152***
	(0.045)	(0.044)	(0.044)	(0.044)	(0.044)	(0.045)	(0.044)
Score	0.095***	0.084***	0.091***	0.087***	0.085***	0.088***	0.088***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Constant	3.108***	3.199***	3.164***	3.164***	3.164***	3.175***	3.190***
	(0.141)	(0.138)	(0.138)	(0.138)	(0.138)	(0.140)	(0.139)
Observations	504	504	504	504	504	504	504
R-squared	0.324	0.368	0.359	0.363	0.356	0.346	0.353
R2	0.302	0.346	0.337	0.341	0.333	0.324	0.330
F	14.57	16.66	16.03	16.29	15.80	15.15	15.60

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

According to Model 2, the regression coefficient of Service Quality is 0.12, and it has passed the significance test (P<0.05). That is to say, the Service Quality can promote the learning results, proving hypothesis H1 is not rejected. Difference of service quality positively affects learning outcomes. The larger the difference, the better the school performance, which is consistent with the conclusion of previous studies. At the same time, the results of the regression of gender, major and minority show that these variables have no significant influence on students' academic achievements. The regression results of the enrollment year demonstrate that the later the students are enrolled, the better the average study results, which may be due to the fact that the students who are just enrolled have higher learning enthusiasm and take the course more seriously. As time goes by, some students' enthusiasm for learning declines, and their overall academic performance declines. In terms of graduation intention, compared with the students who intend to study abroad, the average learning results of students who have no clear plans in the future are worse, and there is no difference between the learning results of students who intend to pursue further studies or employment in China and those of students studying abroad. In addition, the academic achievement of students living in cities is 0.117 higher than that of students living in villages and towns on average; students with parents' education level of high school or junior college have better academic achievements than those with parents' education level of primary school or below. On average, the academic achievement of students who are one child is 0.14 higher than those who are not. The greater the difference between the scores of the college entrance examination and the entry score, the better the students' academic achievement.

Similarly, according to Model 3-7, the coefficients of explanatory variables are 0.108, 0.093, 0.077, 0.079 and 0.075, respectively, all of which pass the significance test (P<0.05). That is, the higher the quality of Tangibles, Reliability, Responsiveness, Assurance and Empathy, the better the students' learning results, proving hypothesis H1a-H1e are all not rejected. Among them, Tangibles plays the most significant role in promoting learning outcomes. This may be because Reliability, Responsiveness, Assurance, Empathy dimensions are intangible and lagging, so it is difficult to judge the effect of these dimensions. In this case, the tangible dimension is the most easily perceived dimension for students to perceive and an important factor to judge the quality of education service. Therefore, the Tangible dimension plays a greater role in promoting learning outcomes than other dimensions. From the point of view of management, tangibles is also a quality factor that universities can easily control and have high efficiency.

4.5.3 Mediating effect regression

According to the hypothesis H2 and H2a-H2e in Chapter 3, the Mediation Effect Regression Models are constructed. Taking hypothesis H2 as an example, the regression models are as follows, i.e. Equation 4.8 and Equation 4.9. Model 8 (see Equation 4.8) changed the explained variable into student satisfaction based on Model 2. Model 9 (see Equation 4.9) added student satisfaction as an explanatory variable based on Model 2. If the regression coefficient of Service Quality in Model 2 and Model 8 is significant, and the regression coefficient of student satisfaction in Model 9 is significant, the variable of student satisfaction can be used as a mediator to influence the relationship between Service Quality and learning outcomes. The regression results are shown in Table 4.16.

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\ \boldsymbol{ServiceQuality} + \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} \\ &+ \boldsymbol{\alpha_4 Major} + \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} \\ &+ \boldsymbol{\alpha_7 Education} + \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.8}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\ \boldsymbol{StudentSatisfaction} + \boldsymbol{\beta_1}\ \boldsymbol{ServiceQuality} \\ &+ \boldsymbol{\alpha_2 Gender} + \boldsymbol{\alpha_3 Grade} + \boldsymbol{\alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention} + \boldsymbol{\alpha_6 Location} + \boldsymbol{\alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation} + \boldsymbol{\alpha_9 One_child} + \boldsymbol{\alpha_{10} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.9}$$

Table 4.16 Regression result for mediating effect

VARIABLES	Model 8 Student Satisfaction	Model 9 Outcome
Student Satisfaction		0.294***
		(0.017)
Service Quality	0.565***	-0.046*
	(0.044)	(0.019)
Gender(female)	0.317**	-0.022
	(0.108)	(0.040)
Grade (Sophomore)	-0.671***	0.007
	(0.184)	(0.068)
Grade (Junior)	-0.616***	-0.039
	(0.175)	(0.065)
Grade (Senior)	-0.745***	-0.048
	(0.201)	(0.074)
Major (Communication)	-0.022	-0.023
	(0.096)	(0.035)
Major (Microelectronic)	0.091	-0.090*
	(0.116)	(0.042)
Graduation intention (Study in China)	-0.202*	-0.026
	(0.098)	(0.036)
Graduation intention	0.077	0.010

(Work)		
	(0.409)	(0.149)
Graduation intention (Do not know)	-0.301**	-0.111**
	(0.109)	(0.040)
Location (City)	0.273*	0.036
	(0.110)	(0.040)
Education (Junior)	0.230	0.029
	(0.223)	(0.082)
Education (Senior)	0.428*	0.109
	(0.215)	(0.079)
Education (College)	0.749***	0.160*
	(0.211)	(0.078)
Nation (Minority)	-0.176^	0.051
	(0.102)	(0.038)
One_child (Yes)	0.530***	-0.016
	(0.094)	(0.035)
Score	0.168***	0.035***
	(0.026)	(0.010)
Constant	4.938***	1.746***
	(0.293)	(0.135)
Observations	504	504
R-squared	0.540	0.617
r2_a	0.523	0.603
F	33.49	43.42

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ^ p<0.1

From table 4.15, the regression coefficient of Service Quality in Model 2 is significant. Model 8 in table 4.16 reveals that the regression coefficient of Service Quality to student satisfaction is 0.565($p<0.05$), which indicates that Service Quality can significantly promote student 'satisfaction. According to the regression results of Model 9, student satisfaction has a significant role in promoting learning outcomes. Hypothesis H2 is not rejected Therefore, student satisfaction plays an intermediary role in the relationship between Service Quality and learning outcomes, that is, Service Quality can affect learning outcomes through student satisfaction.

Similarly, according to Attached Table 1-5, student satisfaction plays an intermediary role in the relationship between quality of Tangibles (Reliability, Responsiveness, Assurance and Empathy) and learning outcomes, that is, the quality of Tangibles (Reliability, Responsiveness, Assurance and Empathy) can affect learning outcomes through student satisfaction, proving hypothesis H2a-H2e are all not rejected. The most important responsibility of higher education institutions is to improve all aspects of services, improve perceived service quality and improve student satisfaction. Also perceived service quality is the premise of satisfaction, and different service quality contributes to satisfaction in different ways. Of all the dimensions that affect student satisfaction, Tangibles is the most important components. The reason is similar to the

reason that Tangibles boosts learning outcomes. As the most intuitive and perceived dimension, Tangibles plays an important role in students' satisfaction. Therefore, in order to improve student satisfaction of Chinese-foreign cooperation education, Tangibles is the most urgent Service Quality dimensions to be improved.

4.5.4 Moderating effect regression

According to the research results of Toutkoushian and Smart (2001), the level and type of the school itself will affect the students' learning results. As special institutions of higher learning, Chinese-foreign cooperation in running schools adopt the advanced educational ideas of world-famous universities to train students with international vision and international competitiveness. Frequent international interaction, as the most important feature of Chinese-foreign cooperative education, plays an important role in the relationship between service quality and student satisfaction. In order to explore under what conditions the promotion effect of Service Quality on students' satisfaction will be stronger, that is, to test whether the hypothesesH3 and H3a-H3e are rejected, this section takes inter-participation as a moderating variable, and tests the moderating effect by establishing an interactive item with the centralized Service Quality (or Tangibles, Reliability, Responsiveness, Assurance, and Empathy) and centralized inter-participation.

The regression models are as follows, i.e. Equation 10-15. Model 10 (see Equation 4.10) adds Service Quality, inter-participation and an interaction term that is the product of the centralized Service Quality and the centralized inter-participation on the basis of Model 2. Model 11 (see Equation 4.11) adds Tangibles, inter-participation and an interaction term that is the product of the centralized Tangibles and the centralized inter-participation on the basis of Model 3.Model 12 (see Equation 4.12) adds Reliability, inter-participation and an interaction term that is the product of the centralized Reliability and the centralized inter-participation on the basis of Model 4.Model 13 (see Equation 4.13) adds Responsiveness, inter-participation and an interaction term that is the product of the centralized Responsiveness and the centralized inter-participation on the basis of Model 5.Model 14(see Equation 4.14) adds Assurance, inter-participation and an interaction term that is the product of the centralized Assurance and the centralized inter-participation on the basis of Model 6. Model 15(see Equation 4.15) adds Empathy, inter-participation and an interaction term that is the product of the centralized Empathy and the centralized inter-participation on the basis of Model 7.

If the coefficient of the interaction term consisting of Service Quality (or Tangibles,

Reliability, Responsiveness, Assurance, and Empathy) and inter-participation is significant, then inter-participation plays a moderating role in the relationship between learning result and Service Quality (or Tangibles, Reliability, Responsiveness, Assurance, and Empathy). The regression results are shown in Table 4.17.

$$\begin{aligned} &\boldsymbol{Student\ Satisfaction} \\ &= \alpha_0 + \alpha_1\, \boldsymbol{ServiceQuality} + \alpha_2 \boldsymbol{InterParticipation} \\ &+ \alpha_3 \overline{\boldsymbol{InterParticipation}} \times \overline{\boldsymbol{ServiceQuality}} \\ &+ \alpha_4 \boldsymbol{Gender} + \alpha_5 \boldsymbol{Grade} + \alpha_6 \boldsymbol{Major} \\ &+ \alpha_7 \boldsymbol{Graduation_intention} + \alpha_8 \boldsymbol{Location} \\ &+ \alpha_9 \boldsymbol{Education} + \alpha_{10} \boldsymbol{Nation} + \alpha_{11} \boldsymbol{One_child} \\ &+ \alpha_{12} \boldsymbol{Score} + \varepsilon \end{aligned} \tag{4.10}$$

$$\begin{aligned} &\boldsymbol{Student\ Satisfaction} \\ &= \alpha_0 + \alpha_1\, \boldsymbol{Tangibility} + \alpha_2 \boldsymbol{InterParticipation} \\ &+ \alpha_3 \overline{\boldsymbol{InterParticipation}} \times \overline{\boldsymbol{Tangibility}} \\ &+ \alpha_4 \boldsymbol{Gender} + \alpha_5 \boldsymbol{Grade} + \alpha_6 \boldsymbol{Major} \\ &+ \alpha_7 \boldsymbol{Graduation_intention} + \alpha_8 \boldsymbol{Location} \\ &+ \alpha_9 \boldsymbol{Education} + \alpha_{10} \boldsymbol{Nation} + \alpha_{11} \boldsymbol{One_child} \\ &+ \alpha_{12} \boldsymbol{Score} + \varepsilon \end{aligned} \tag{4.11}$$

$$\begin{aligned} &\boldsymbol{Student\ Satisfaction} \\ &= \alpha_0 + \alpha_1\, \boldsymbol{Reliability} + \alpha_2 \boldsymbol{InterParticipation} \\ &+ \alpha_3 \overline{\boldsymbol{InterParticipation}} \times \overline{\boldsymbol{Reliability}} + \alpha_4 \boldsymbol{Gender} \\ &+ \alpha_5 \boldsymbol{Grade} + \alpha_6 \boldsymbol{Major} + \alpha_7 \boldsymbol{Graduation_intention} \\ &+ \alpha_8 \boldsymbol{Location} + \alpha_9 \boldsymbol{Education} + \alpha_{10} \boldsymbol{Nation} \\ &+ \alpha_{11} \boldsymbol{One_child} + \alpha_{12} \boldsymbol{Score} + \varepsilon \end{aligned} \tag{4.12}$$

$$\begin{aligned} &\boldsymbol{Student\ Satisfaction} \\ &= \alpha_0 + \alpha_1\, \boldsymbol{Reactivity} + \alpha_2 \boldsymbol{InterParticipation} \\ &+ \alpha_3 \overline{\boldsymbol{InterParticipation}} \times \overline{\boldsymbol{Reactivity}} + \alpha_4 \boldsymbol{Gender} \\ &+ \alpha_5 \boldsymbol{Grade} + \alpha_6 \boldsymbol{Major} + \alpha_7 \boldsymbol{Graduation_intention} \\ &+ \alpha_8 \boldsymbol{Location} + \alpha_9 \boldsymbol{Education} + \alpha_{10} \boldsymbol{Nation} \\ &+ \alpha_{11} \boldsymbol{One_child} + \alpha_{12} \boldsymbol{Score} + \varepsilon \end{aligned} \tag{4.13}$$

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\ \boldsymbol{Assurance} + \boldsymbol{\alpha_2 InterParticipation} \\ &+ \boldsymbol{\alpha_3}\overline{\boldsymbol{InterPartıcıpatıon}} \times \overline{\boldsymbol{Assurance}} + \boldsymbol{\alpha_4 Gender} \\ &+ \boldsymbol{\alpha_5 Grade} + \boldsymbol{\alpha_6 Major} + \boldsymbol{\alpha_7 Graduation_intention} \\ &+ \boldsymbol{\alpha_8 Location} + \boldsymbol{\alpha_9 Education} + \boldsymbol{\alpha_{10} Nation} \\ &+ \boldsymbol{\alpha_{11} One_child} + \boldsymbol{\alpha_{12} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.14}$$

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\ \boldsymbol{Empathy} + \boldsymbol{\alpha_2 InterParticipation} \\ &+ \boldsymbol{\alpha_3}\overline{\boldsymbol{InterPartıcıpatıon}} \times \overline{\boldsymbol{Empathy}} + \boldsymbol{\alpha_4 Gender} \\ &+ \boldsymbol{\alpha_5 Grade} + \boldsymbol{\alpha_6 Major} + \boldsymbol{\alpha_7 Graduation_intention} \\ &+ \boldsymbol{\alpha_8 Location} + \boldsymbol{\alpha_9 Education} + \boldsymbol{\alpha_{10} Nation} \\ &+ \boldsymbol{\alpha_{11} One_child} + \boldsymbol{\alpha_{12} Score} + \boldsymbol{\varepsilon} \end{aligned} \tag{4.15}$$

Table 4.17 Regression result of moderating effect

VARIABLES	Model 10 Student Satisfaction	Model 11 Student Satisfaction	Model 12 Student Satisfaction	Model 13 Student Satisfaction	Model 14 Student Satisfaction	Model 15 Student Satisfaction
Service Quality	-0.009					
	(0.105)					
Tangibles		0.160*				
		(0.074)				
Reliability			0.184**			
			(0.061)			
Responsiveness				0.050		
				(0.062)		
Assurance					-0.065	
					(0.077)	
Empathy						-0.048
						(0.069)
Inter-Participation	-0.390***	-0.293***	-0.270***	-0.342***	-0.371***	-0.365***
	(0.051)	(0.041)	(0.041)	(0.041)	(0.037)	(0.040)
Inter-Participation× Service Quality	0.374***					
	(0.071)					
Inter-Participation× Tangibles		0.237***				
		(0.053)				
Inter-Participation× Reliability			0.169***			
			(0.043)			
Inter-Participation× Responsiveness				0.230***		
				(0.044)		
Inter-Participation× Assurance					0.358***	
					(0.054)	
Inter-Participation× Empathy						0.285***
						(0.047)
Gender(female)	0.288**	0.286**	0.296**	0.298**	0.229*	0.276**
	(0.093)	(0.108)	(0.107)	(0.106)	(0.106)	(0.106)
Grade (Sophomore)	-0.550***	-0.547**	-0.471*	-0.536**	-0.592**	-0.616***
	(0.156)	(0.186)	(0.184)	(0.183)	(0.181)	(0.183)
Grade (Junior)	-0.552***	-0.503**	-0.533**	-0.588***	-0.583***	-0.540**
	(0.136)	(0.176)	(0.173)	(0.173)	(0.171)	(0.173)
Grade (Senior)	-0.669***	-0.597**	-0.644**	-0.699***	-0.719***	-0.642**
	(0.156)	(0.201)	(0.198)	(0.198)	(0.196)	(0.197)
Major (Communication)	-0.003	-0.061	0.002	0.031	-0.013	-0.000
	(0.086)	(0.095)	(0.094)	(0.094)	(0.093)	(0.094)
Major (Microelectronic)	0.016	0.007	0.015	0.047	-0.017	0.016
	(0.103)	(0.116)	(0.114)	(0.114)	(0.113)	(0.114)
Graduation intention (Study in China)	-0.202*	-0.179^	-0.161^	-0.161^	-0.167^	-0.224*
	(0.095)	(0.098)	(0.096)	(0.096)	(0.095)	(0.096)

Graduation intention (Work)	0.141	-0.007	0.237	0.201	-0.105	0.082
	(0.330)	(0.407)	(0.403)	(0.401)	(0.398)	(0.401)
Graduation intention (Do not know)	-0.259*	-0.273*	-0.291**	-0.258*	-0.303**	-0.303**
	(0.113)	(0.109)	(0.108)	(0.107)	(0.106)	(0.107)
Location (City)	0.243*	0.251*	0.283**	0.248*	0.234*	0.248*
	(0.099)	(0.110)	(0.108)	(0.108)	(0.107)	(0.108)
Education (Junior)	0.230	0.254	0.286	0.222	0.191	0.141
	(0.190)	(0.223)	(0.220)	(0.219)	(0.217)	(0.218)
Education (Senior)	0.451**	0.458*	0.471*	0.422*	0.459*	0.357^
	(0.170)	(0.214)	(0.212)	(0.210)	(0.209)	(0.210)
Education (College)	0.792***	0.819***	0.847***	0.770***	0.799***	0.716***
	(0.161)	(0.211)	(0.208)	(0.207)	(0.206)	(0.207)
Nation (Minority)	-0.229*	-0.209*	-0.241*	-0.196^	-0.189^	-0.193^
	(0.093)	(0.103)	(0.101)	(0.102)	(0.100)	(0.101)
One_child(Yes)	0.463***	0.530***	0.514***	0.491***	0.452***	0.493***
	(0.095)	(0.094)	(0.092)	(0.092)	(0.092)	(0.092)
Score	0.145***	0.173***	0.164***	0.149***	0.144***	0.148***
	(0.021)	(0.026)	(0.025)	(0.026)	(0.025)	(0.026)
Constant	6.630***	6.070***	5.960***	6.359***	6.516***	6.509***
	(0.314)	(0.345)	(0.339)	(0.345)	(0.330)	(0.338)
Observations	504	504	504	504	504	504
R-squared	0.588	0.545	0.557	0.560	0.566	0.560
r2_a	0.572	0.527	0.540	0.542	0.549	0.543
F	46.56	30.53	32.08	32.36	33.26	32.40

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ^ p<0.1

A regression is carried out in Model 10 between Service Quality, Inter-participation, and the interaction between Service Quality and international interaction to student satisfaction. The results show that the regression coefficient between Service Quality and Inter-participation is significant (= 0.374, p<0.001), which indicates that International interactive participation has a moderating effect on the relationship between Service Quality and student satisfaction. Hypothesis H3 is not rejected. Similarly, as can be seen from model 11-15 in Table 4.17, the regression coefficient between Tangible and international interactive participation is 0.237(p<0.001), which is 0.169(p<0.001) between Reliability and international interactive participation, 0.230(p<0.001)between Reliability and international interactive participation, 0.358(p<0.001) between Assurance and international interactive participation, and 0.285(p<0.001) between Empathy and international interactive participation, proving the validity of hypotheses H3a-H3e, that means H3a-H3e are not rejected. Inter-participation can positively adjust the relationship between Tangibles and learning satisfaction, that is, the higher the inter-participation, the stronger the positive relationship between Service Quality and learning satisfaction; inter-participation also plays a positive role in adjusting the relationship

between learning satisfaction and other quality , including Reliability, Responsiveness, Assurance, and Empathy, which can be proved by the fact that the higher international interactive participation, the stronger the positive relationship between learning satisfaction and the quality of Reliability, Responsiveness, Assurance, and Empathy. Therefore, in order to improve students' satisfaction as much as possible, Chinese-foreign cooperation in running schools should attach great importance to international interaction. Strengthen cooperation and exchanges with foreign schools and universities in the province, constantly enrich the international atmosphere of the campus, and correctly guide students' international vision.

4.6 Chapter summary

This chapter mainly analyzes the data of the questionnaire, the reliability and validity of the questionnaire and the Service Quality. On the basis of the analysis, a multiple regression model is established, which verifies the hypothesis in Chapter 3.

The first section counts the sample information of the questionnaire and compares it with the overall data. The obtained results show that the data are representative to some extent. The second and third sections test the reliability and validity of the questionnaire, which proves that the data of the questionnaire designed in this study has high reliability and strong internal consistency and can be used for subsequent modeling and analysis. The fourth section analyzes the current educational Service Quality of Chinese-foreign cooperation in running universities and the difference of indicators in various dimensions, and gives suggestions on how to narrow the difference of educational Service Quality, which is of management significance. The fifth section analyzes the correlation of the variables involved, eliminating the influence of multiple contributions. A regression model is constructed to verify the hypothesis in Chapter 3. The results of benchmark regression, mediating effect regression and regulative effect regression are consistent with the hypothesis.

This thesis proposes the following research hypotheses in Chapter 3:

H1: Perceived service quality has a positive impact on learning outcomes.

H1a: Tangibles has a positive impact on learning outcomes.

H1b: Reliability has a positive impact on learning outcomes.

H1c: Responsiveness has a positive impact on learning outcomes.

H1d: Assurance has a positive impact on learning outcomes.

H1e: Empathy has a positive impact on learning outcomes.

H2: Student satisfaction plays a mediating role in perceived service quality and learning

outcomes, that is, perceived service quality affects learning outcomes through student satisfaction.

H2a: Student satisfaction plays a mediating role in tangibles and learning outcome, that is, tangibles influences learning outcome through student satisfaction.

H2b: Student satisfaction plays a mediating role in reliability and learning outcomes, that is, reliability affects learning outcomes through student satisfaction.

H2c: Student satisfaction plays a mediating role in responsiveness and learning outcome, that is, responsiveness influences learning outcome through student satisfaction.

H2d: Student satisfaction plays a mediating role in assurance and learning outcome, that is, assurance affects learning outcome through student satisfaction.

H2e: Student satisfaction plays a mediating role in empathy and learning outcome, that is, empathy affects learning outcome through student satisfaction.

H3: International interaction participation positively moderates the relationship between perceived service quality and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction.

H3a: International interaction participation positively moderates the relationship between tangibles and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction.

H3b: International interaction participation positively moderates the relationship between reliability and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction.

H3c: International interaction participation positively moderates the relationship between responsiveness and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction.

H3d: International interaction participation positively moderates the relationship between assurance and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction.

H3e: International interaction participation positively moderates the relationship between empathy and learning satisfaction, that is, the higher the international interaction participation, the stronger the positive relationship between perceived service quality and learning satisfaction.

This chapter prove that the 18 research hypotheses are supported.

Chapter 5: Conclusion and Discussion

This chapter summarizes the research of the whole thesis and gives some suggestions to improve the service quality of Chinese-foreign joint educational projects according to the research results.

5.1 Research Conclusion

In recent years, with the development of globalization, Chinese-foreign cooperation in running schools has been widely used in China's higher education. This mode of cooperation means that the Chinese and foreign universities jointly carry out education and teaching activities, relying on the teaching resources and advantages of local universities, introduce the teaching mode and teaching resources of foreign universities, and provide education and teaching services with international characteristics. The emergence of Chinese-foreign joint educational programs has provided students with more educational choices and helped promote international educational exchanges and cooperation.

However, the service quality and student learning results of Chinese-foreign cooperative schools have always been the focus of the education circle and students. In this cooperative mode, colleges and universities should shoulder more teaching responsibilities to ensure their teaching quality and characteristics. Therefore, how to guarantee the service quality and teaching level of cooperative school running institutions and improve students' learning effect and satisfaction are common problems faced by Sino-foreign cooperative school running at present.

In order to solve these problems, the SERVQUAL model is used to study the service quality, student satisfaction, student participation in international interaction and learning outcomes of Chinese-foreign joint educational program. The SERVQUAL model is a quality management tool widely used in the service industry. It evaluates service quality through five dimensions: tangibles, reliability, responsiveness, assurance and empathy. In this study, we evaluated the service quality of Chinese-foreign cooperative education with the Glasgow School of UESTC as a case study.

Through the research findings of this thesis, the research also found that the quality of service has a significant impact on learning outcomes and student satisfaction. The higher the

service quality, the higher the student satisfaction, the better the learning outcomes. In addition, the service quality of Chinese-foreign cooperative schools is generally excellent, especially in reliability and responsiveness. However, there are certain deficiencies in the tangibles aspect. Therefore, Chinese-foreign joint educational program should pay attention to improving the quality of service so as to improve the learning outcome and satisfaction of students.

The study also found that in addition to the service quality, the international characteristics of Chinese-foreign cooperative schools also make the importance of students' international interaction and participation prominent. The improvement of students' international vision and cross-cultural communication ability is not only conducive to students' personal growth, but also conducive to the improvement of students' career competitiveness. The stronger students' participation in international interaction, the greater their satisfaction in learning, which will positively affect the learning outcome. Therefore, Chinese-foreign cooperative schools should pay attention to the setting of international courses, actively encourage students to participate in international exchange programs, and improve students' international vision and cross-cultural communication ability.

To sum up, perceived service quality positively affects learning outcomes. Students satisfaction plays a mediating role in perceived service quality and learning outcomes. International interaction participation positively moderates the relationship between perceived service quality and learning satisfaction. Chinese-foreign cooperation in running schools should pay attention to improving service quality and students' learning effect and satisfaction. At the same time, strengthen students' international interaction and participation, improve students' comprehensive quality and professional quality. These measures can help students better adapt to the trend of globalization and lay a solid foundation for their future career development. Chinese-foreign joint educational programs should constantly improve the quality of services according to students' feedback and improve students' satisfaction. Through these efforts, Chinese-foreign cooperative schools can provide students with better education and teaching services and promote the development of international educational exchanges and cooperation.

5.2 Discussion and Suggestion

Based on the theoretical basis and data analysis in the previous literature, combined with the experience of other regions and countries in improving the quality of education services of Chinese-foreign cooperative education, the countermeasures to improve the quality and efficiency of education services of Chinese-foreign cooperative education in Glasgow College

of the University of Electronic Science and Technology of China are proposed.

5.2.1 Tangibles

Through difference analysis of Service Quality in Chapter 4, we know that there is still a huge difference between the teaching equipment and teaching mode and students' expectations in Chinese-foreign cooperative schools. Therefore, it is necessary to improve both hardware and software to reduce the current gap between expected Service Quality and perceived Service Quality.

First of all, on the hardware side, on the basis of the original teaching hardware and software and management level, we should effectively increase teaching investment , establish diversified teaching laboratories and introduce advanced modern teaching equipment to guarantee a good teaching environment in colleges and universities in order to cultivate students' originality and scientific thinking methods, improve their cognitive and hands-on abilities, create a good atmosphere of learning interest and form a benign development. We make full use of internal and external resources, constantly expand the cooperation between schools and enterprises, between colleges and research institutes, promote the combination of production, learning and research, ensure that each major has a practical training base to meet the teaching needs, and constantly improve the conditions of the internship and practical training base.

Secondly, building a perfect teaching quality assurance system is the premise and foundation for implementing the management of teaching operation process and improving the quality of education service. We should further strengthen teaching, build an effective teaching operation mechanism with advanced teaching concepts, modern curriculum system, scientific cultivation mode and perfect quality assurance system, effectively cultivate students' learning independent initiative, create a good learning environment, and focus on improving students' learning ability, practical ability, and innovation ability. We will build subject curriculum clusters to meet students' diversified learning development needs, develop subject series by expanding within subjects and cross-integrating between subjects, so as to reflect the hierarchy and selectivity of subject curriculum content; integrate subject curriculum content, reorganize subject knowledge modules, merge, add and delete teaching content, and strive to reduce class time to achieve high quality and efficiency of subject teaching. It should reflect the core values of "people-oriented, multicultural and independent choice", the principles of basic, practical, selective, integrated and contemporary curriculum design, and the differences and

characteristics that distinguish our school program from schools of the same level.

Chinese-foreign cooperative schools must pay attention to the construction of teaching hardware and software. Only the organic combination of teaching equipment and teaching mode can effectively improve the satisfaction.

5.2.2 Reliability and Responsiveness

The current difference in the quality of education services of Glasgow schools with Chinese-foreign cooperation obviously exists, one of which is students do not feel adequate and well-developed channels to complain. Therefore, how to actively improve the current blockage, difficulties and pain points of students in response to their demands is the key to improving the quality of education services.

First of all, the college needs to guide and cultivate students to form a correct awareness of interest claims. We should hold various educational and practical activities, thematic class meetings, seminars and other forms to publicize the Party's educational policies, laws and regulations, and the school's development plan and management system, to improve the transparency of decision-making and management, and to let students know their rights and obligations, so that they can reasonably express their individual interests while supporting the school's construction and development. Secondly, it is necessary to set up relevant feedback channels to actively respond to the interests of the majority of students in a timely manner. Through the school (college) leadership mailbox, the academic department minister mailbox, teachers and student’s forum and other forms, a wide range of students' opinions and suggestions, and actively build a "bridge" to contact with teachers and students, to open the "last mile" of service to students. College management should take the initiative to go deep into the student body, timely understanding of the student's thought dynamics, take the initiative to collect information on the student's demands, and to classify them and propose solutions to the problem. In the principle of timely and effective, for unreasonable student demands, we should do a good job of relevant explanation, communication and guidance work, in order to obtain the understanding and support of students; for some issues that require long-term attention, there should be regular return visits, and actively communicate with students to understand a certain stage of the resolution of such demands and student satisfaction. For sensitive issues involving students' interests, the college should set up a special office to handle students' demands, improve the student complaint system, and standardize the complaint handling process to maximize the protection of students' legitimate rights and interests.

5.2.3 Assurance and Empathy

According to the regression results, we know that students living in cities, students with a high degree of service culture and students who are only children have higher satisfaction and are more likely to achieve good learning outcomes. Since the academic performance of students varies significantly by region, grade level, and living environment, the College must pay attention to the individual differences of students, especially those from disadvantaged groups. For example, for economically disadvantaged students, the college establishes a system of corresponding scholarships, grants, subsidies, and loans for special hardship students, and gives special hardship students a reduction in tuition and fees or provides work-study positions. At the same time, through various ways to attract the attention of enterprises and institutions outside the university to poor students and provide them with financial assistance. The precise allocation of funds and a clear focus on students. Factors such as different majors, different grades, and the degree of students' economic difficulties should be considered. Students with financial difficulties who have established a file, students from rural low-income families, students who are supported by special hardship assistance in rural areas, orphans and disabled students, children of martyrs, and students whose families have suffered from natural disasters or emergencies and other special circumstances are taken as key financial aid recipients. For psychologically disadvantaged college students, we should help them set up ambitious goals, enhance their inner spiritual motivation, and give them psychological comfort, financial support in life, and encouragement in their studies, to realize both material and spiritual care. The establishment of student psychological files is an important condition and necessary guarantee to strengthen students' psychological education work, promote quality education to deepen development and realize education modernization, which can provide a decision-making basis for the macro management of the school and provide dynamic monitoring means for students' physical and mental health development; carry out individual counseling work and group psychological work, provide students with psychological support and psychological guidance in time, and promote the overall quality of students The school also provides individual counseling and group psychological work to provide students with timely psychological support and guidance and promote the overall improvement of students' quality and harmonious development of their personalities.

5.2.4 International interactive participation

As one of the most important features of Chinese-foreign cooperation in running universities,

international cooperation and exchange plays an important role in promoting students' satisfaction and improving students' learning outcomes. In the face of the general trend of economic globalization and internationalization of education, Chinese-foreign cooperation in running universities should make positive reflections, enhance international awareness and have a global vision while strengthening internal connotations, continuously expanding the space for foreign exchanges and cooperation, forming a new situation of all-round, multi-level and multiform international exchanges and cooperation, accelerate the integration into the process of internationalization of higher education, and continuously improve the core competitiveness of the college. Introduce foreign high-quality educational resources and curriculum systems to promote the internationalization of teaching content. We will introduce international high-quality digital teaching resources, develop e-learning courses, establish digital libraries and virtual laboratories, establish an open and flexible public service platform for educational resources, promote the popularization and sharing of high-quality educational resources, innovate online teaching models, and carry out high-quality and high-level distance learning education.

To sum up, from the literature review, it can be seen that quality of service and servqual are widely used in various industries, but less often in the field of higher education. Even if there is research in the field of higher education, there is no research on Chinese-foreign cooperation in running schools. As a result, there is no literature or theoretical support for the influence of higher education service quality on students' satisfaction and learning results in Chinese-foreign cooperative schools. This study discusses the influence of several dimensions of service quality on learning outcomes by combining the concept of service quality on Chinese-foreign cooperative education. This can not only contribute to the quality management theory, but also provide ways to improve students' satisfaction and promote talent training of higher Education.

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Appendix A: Questionnaire

Dear Students of Glasgow College, UESTC,

Hello! After studying and living in Glasgow College for some time, you must have a lot of feelings. UESTC has been trying its best to provide convenience and help for both your study and your life here. In order to know your opinions on the work of Chinese-Foreign Cooperation in Running Universities of UESTC, we ask for your assistance in this investigation.

The survey is anonymous, and the answer is subjective. You only need to fill in your true opinion according to the question. We guarantee that the data will be used for academic research only, and any information you fill in will be treated as strictly confidential. Thank you for your cooperation.

I. In the table below, the middle column "indicators" refers to the service provided by Chinese-foreign cooperative in running universities, the left column "service quality you expect" refers to your expectation of the service, and the right column "service quality you perceive" refers to the service quality you actually felt, and the numbers 1-7 represent the following meanings.

Terrible	Very bad	Bad	Average	Good	Very good	Excellent
1	2	3	4	5	6	7

Please select the number that best represents your true feelings and tick the corresponding box.

1.Tangibles

Service quality you expect							Indicators	Service quality you perceive						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
							Q1. The College has complete and modern teaching equipment							
							Q2. The College offers diversified and practical courses and teaching materials							
							Q3. The teachers of the College have rich theoretical knowledge and practical experience							
							Q4. The College has a perfect counseling service center for further study and employment							
							Q5. The College provides relevant policies and regulations, guidelines and other information through various means							
							Q6. The College's promotional materials are real, rich and attractive							
							Q7. The college environment is beautiful							
							Q8. The teachers and staff of the College are well dressed, neat and clean							

2. Reliability

Service quality you expect							Indicators	Service quality you perceive						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
							Q9. All commitments made by the College to students are fulfilled on time							
							Q10. Students in the cooperation program will get as much help as possible when they encounter difficulties.							
							Q11. College teachers' evaluation of students is fair and reliable							
							Q12. College teachers can be trusted							
							Q13. The curriculum of the College is reasonable							

3. Responsiveness

Service quality you expect							Indicators	Service quality you perceive						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
							Q14. The College has channels for students to express their complaints							
							Q15. College teachers can respond to students for the first time even when they are busy							
							Q16. College staff are always ready to help students							
							Q17. The reasonable demands of College students can be met quickly							

4. Assurance.

Service quality you expect							Indicators	Service quality you perceive						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
							Q18. College staff have high professional ethics							
							Q19. College teachers have a high academic level.							
							Q20. The College has reasonable rules and regulations and treats all students equally							
							Q21. The faculty and staff are always courteous							

5. Empathy.

Service quality you expect							Indicators	Service quality you perceive						
1	2	3	4	5	6	7		1	2	3	4	5	6	7
							Q22. The College gives personalized care to students							
							Q23. The service hours of each department of the College are convenient for all students							
							Q24. Faculty and students communicate frequently							
							Q25. College rules and regulations are humanized.							

II. Are the following related statements consistent with your actual situation in the learning process? Please score according to the degree of conformity. The numbers 1-7 represent the following meanings.

terrible	Very bad	bad	average	good	Very good	excellent
1	2	3	4	5	6	7

Indicators	1	2	3	4	5	6	7
Q1. In addition to teaching materials, I often take the initiative to consult English literature and academic materials							
Q2. I often browse the websites of world-renowned universities to learn about their trends							
Q3. In addition to the English courses prescribed by UESTC, I take the initiative to learn English and improve my English communication skills							
Q4. I often communicate directly with foreign teachers in the College							
Q5. I am very satisfied with the teaching service provided by the College							
Q6. I am very satisfied with the non-teaching services provided by the College							
Q7. I am very satisfied with the overall service quality of the College							
Q8. I feel very happy and proud to study in this program							

III. Basic personal information

Q1. Your gender: [1] Male [2] Female

Q2. Your grade: [1] sophomore [2] junior [3] senior.

Q3. Your major: _____

Q4. Your graduation intention: [1] Studying abroad [2] Studying at home [3] Employment [4] Not sure

Q5. Your location: [1] City [2] Township or rural area

Q6. Education level of your parents: [1] Primary and Below [2] Junior [3]Senior High [4] College Degree or Above

Q7. Minority Nation ： [1] Yes [2] No

Q8. You are an only one child: [1] Yes [2] No

Q9. Difference Between Admission Score and Entry score: [1] [0,3] [2] [4,6] [3] [7,9]

Q10. Your current GPA: _____.

Appendix B: Attached Table 1

$$\begin{aligned} &\boldsymbol{Student\ Satisfaction} \\ &= \boldsymbol{\alpha_0 + \alpha_1\ Tangibility + \alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{20}$$

$$\begin{aligned} &\boldsymbol{LearningOutcome} \\ &= \boldsymbol{\alpha_0 + \alpha_1\ StudentSatisfaction + \beta_1\ Tangibility} \\ &+ \boldsymbol{\alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{21}$$

VARIABLES	Model 20 Student Satisfaction	Model 21 Outcome
Student Satisfaction		0.285***
		(0.016)
Tangibles	0.488***	-0.031^
	(0.046)	(0.018)
Gender(female)	0.300**	-0.018
	(0.113)	(0.040)
Grade(Sophomore)	-0.688***	0.004
	(0.193)	(0.068)
Grade(Junior)	-0.564**	-0.047
	(0.184)	(0.065)
Grade(Senior)	-0.680**	-0.059
	(0.210)	(0.074)
Major(Communication)	-0.070	-0.020
	(0.100)	(0.035)
Major(Microelectronic)	0.089	-0.089*
	(0.121)	(0.042)
Graduation intention (Study in China)	-0.138	-0.033
	(0.102)	(0.036)
Graduation intention (Work)	-0.049	0.020
	(0.427)	(0.150)
Graduation intention (Do not know)	-0.284*	-0.115**
	(0.114)	(0.040)
Location(City)	0.289*	0.037
	(0.115)	(0.040)
Education(Junior)	0.243	0.031
	(0.233)	(0.082)
Education(Senior)	0.394^	0.117

VARIABLES	Model 20 Student Satisfaction	Model 21 Outcome
	(0.224)	(0.079)
Education(College)	0.755***	0.167*
	(0.221)	(0.078)
Nation(Minority)	-0.195^	0.051
	(0.107)	(0.038)
One_child(Yes)	0.608***	-0.018
	(0.098)	(0.036)
Score	0.197***	0.034***
	(0.027)	(0.010)
Constant	4.759***	1.806***
	(0.305)	(0.131)
Observations	504	504
R-squared	0.497	0.614
r2_a	0.480	0.600
F	28.30	42.95

Notes: Model 20 (see Equation 20) changed the explained variable into student satisfaction based on Model 3. Model 21 (see Equation 21) added student satisfaction as an explanatory variable based on Model 3.

Appendix C: Attached Table 2

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0 + \alpha_1\ Reliability + \alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{22}$$

$$\begin{aligned} \boldsymbol{Learning Outcome} &= \boldsymbol{\alpha_0 + \alpha_1\ StudentSatisfaction + \beta_1\ Reliability} \\ &+ \boldsymbol{\alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{23}$$

VARIABLES	Model 22 Student Satisfaction	Model 23 Outcome
Student Satisfaction		0.290***
		(0.016)
Reliability	0.430***	-0.032*
	(0.037)	(0.015)
Gender(female)	0.313**	-0.020
	(0.111)	(0.040)
Grade(Sophomore)	-0.598**	-0.001
	(0.189)	(0.068)
Grade(Junior)	-0.640***	-0.040
	(0.179)	(0.065)
Grade(Senior)	-0.764***	-0.050
	(0.205)	(0.074)
Major(Communication)	-0.018	-0.023
	(0.098)	(0.035)
Major(Microelectronic)	0.073	-0.088*
	(0.118)	(0.042)
Graduation intention (Study in China)	-0.158	-0.031
	(0.100)	(0.036)
Graduation intention (Work)	0.073	0.011
	(0.419)	(0.150)
Graduation intention (Do not know)	-0.349**	-0.109**
	(0.112)	(0.040)
Location(City)	0.315**	0.034
	(0.112)	(0.040)
Education(Junior)	0.358	0.021
	(0.229)	(0.082)
Education(Senior)	0.499*	0.106

VARIABLES	Model 22 Student Satisfaction	Model 23 Outcome
	(0.220)	(0.079)
Education(College)	0.862***	0.155*
	(0.217)	(0.079)
Nation(Minority)	-0.240*	0.055
	(0.105)	(0.038)
One_child(Yes)	0.561***	-0.016
	(0.096)	(0.035)
Score	0.183***	0.035***
	(0.026)	(0.010)
Constant	4.768***	1.783***
	(0.299)	(0.132)
Observations	504	504
R-squared	0.517	0.616
r2_a	0.500	0.602
F	30.63	43.18

Notes: Model 22 (see Equation 22) changed the explained variable into student satisfaction based on Model 4. Model 23 (see Equation 23) added student satisfaction as an explanatory variable based on Model 4.

Appendix D: Attached Table 3

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0 + \alpha_1\ Reactivity + \alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{24}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0 + \alpha_1\ StudentSatisfaction + \beta_1\ Reactivity} \\ &+ \boldsymbol{\alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{25}$$

VARIABLES	Model 24 Student Satisfaction	Model 25 Outcome
Student Satisfaction		0.287***
		(0.016)
Responsiveness	0.362***	-0.027*
	(0.034)	(0.013)
Gender(female)	0.331**	-0.021
	(0.113)	(0.040)
Grade(Sophomore)	-0.707***	0.005
	(0.193)	(0.068)
Grade(Junior)	-0.644***	-0.042
	(0.183)	(0.065)
Grade(Senior)	-0.734***	-0.054
	(0.210)	(0.074)
Major(Communication)	-0.009	-0.024
	(0.100)	(0.035)
Major(Microelectronic)	0.140	-0.093*
	(0.121)	(0.042)
Graduation intention (Study in China)	-0.200^	-0.028
	(0.102)	(0.036)
Graduation intention (Work)	0.065	0.011
	(0.428)	(0.150)
Graduation intention (Do not know)	-0.323**	-0.112**
	(0.114)	(0.040)
Location(City)	0.340**	0.033
	(0.114)	(0.040)
Education(Junior)	0.196	0.033
	(0.233)	(0.082)
Education(Senior)	0.399^	0.114

VARIABLES	Model 24 Student Satisfaction	Model 25 Outcome
	(0.225)	(0.079)
Education(College)	0.719**	0.167*
	(0.221)	(0.078)
Nation(Minority)	-0.131	0.047
	(0.107)	(0.038)
One_child(Yes)	0.570***	-0.015
	(0.098)	(0.035)
Score	0.171***	0.036***
	(0.027)	(0.010)
Constant	4.771***	1.793***
	(0.306)	(0.131)
Observations	504	504
R-squared	0.496	0.615
r2_a	0.479	0.601
F	28.19	43.12

Notes: Model 24 (see Equation 24) changed the explained variable into student satisfaction based on Model 5. Model 25 (see Equation 25) added student satisfaction as an explanatory variable based on Model 5.

Appendix E: Attached Table 4

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0 + \alpha_1\ Assurance + \alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{26}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0 + \alpha_1\ StudentSatisfaction + \beta_1\ Assurance} \\ &+ \boldsymbol{\alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{27}$$

VARIABLES	Model 26 Student Satisfaction	Model 27 Outcome
Student Satisfaction		0.287***
		(0.016)
Assurance	0.399***	-0.036*
	(0.043)	(0.016)
Gender(female)	0.327**	-0.020
	(0.116)	(0.040)
Grade(Sophomore)	-0.840***	0.014
	(0.196)	(0.068)
Grade(Junior)	-0.707***	-0.038
	(0.187)	(0.065)
Grade(Senior)	-0.836***	-0.045
	(0.214)	(0.075)
Major(Communication)	-0.018	-0.023
	(0.102)	(0.035)
Major(Microelectronic)	0.098	-0.089*
	(0.123)	(0.042)
Graduation intention (Study in China)	-0.179^	-0.029
	(0.104)	(0.036)
Graduation intention (Work)	-0.054	0.019
	(0.436)	(0.149)
Graduation intention (Do not know)	-0.326**	-0.113**
	(0.116)	(0.040)
Location(City)	0.303**	0.038
	(0.117)	(0.040)
Education(Junior)	0.083	0.042
	(0.238)	(0.082)
Education(Senior)	0.346	0.117

VARIABLES	Model 26 Student Satisfaction	Model 27 Outcome
	(0.229)	(0.079)
Education(College)	0.690**	0.170*
	(0.225)	(0.078)
Nation(Minority)	-0.196^	0.051
	(0.109)	(0.038)
One_child(Yes)	0.560***	-0.012
	(0.100)	(0.035)
Score	0.184***	0.036***
	(0.028)	(0.010)
Constant	4.850***	1.784***
	(0.313)	(0.131)
Observations	504	504
R-squared	0.475	0.616
r2_a	0.457	0.602
F	25.88	43.24

Notes: Model 26 (see Equation 26) changed the explained variable into student satisfaction based on Model 6. Model 27 (see Equation 27) added student satisfaction as an explanatory variable based on Model 6.

Appendix F: Attached Table 5

$$\begin{aligned} \boldsymbol{Student\ Satisfaction} &= \boldsymbol{\alpha_0 + \alpha_1\ Empathy + \alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{28}$$

$$\begin{aligned} \boldsymbol{LearningOutcome} &= \boldsymbol{\alpha_0 + \alpha_1\ StudentSatisfaction + \beta_1\ Empathy} \\ &+ \boldsymbol{\alpha_2 Gender + \alpha_3 Grade + \alpha_4 Major} \\ &+ \boldsymbol{\alpha_5 Graduation_intention + \alpha_6 Location + \alpha_7 Education} \\ &+ \boldsymbol{\alpha_8 Nation + \alpha_9 One_child + \alpha_{10} Score + \varepsilon} \end{aligned} \tag{29}$$

VARIABLES	Model 28 Student Satisfaction	Model 29 Outcome
Student Satisfaction		0.285***
		(0.016)
Empathy	0.350***	-0.025^
	(0.036)	(0.014)
Gender(female)	0.335**	-0.020
	(0.115)	(0.040)
Grade(Sophomore)	-0.796***	0.010
	(0.194)	(0.068)
Grade(Junior)	-0.679***	-0.040
	(0.185)	(0.065)
Grade(Senior)	-0.728***	-0.056
	(0.212)	(0.074)
Major(Communication)	-0.004	-0.024
	(0.101)	(0.035)
Major(Microelectronic)	0.100	-0.089*
	(0.122)	(0.042)
Graduation intention (Study in China)	-0.217*	-0.027
	(0.104)	(0.036)
Graduation intention (Work)	0.050	0.013
	(0.433)	(0.150)
Graduation intention (Do not know)	-0.326**	-0.112**
	(0.115)	(0.040)
Location(City)	0.290*	0.038
	(0.116)	(0.040)
Education(Junior)	0.113	0.039
	(0.236)	(0.082)
Education(Senior)	0.291	0.123

VARIABLES	Model 28 Student Satisfaction	Model 29 Outcome
	(0.227)	(0.079)
Education(College)	0.642**	0.174*
	(0.224)	(0.078)
Nation(Minority)	-0.173	0.049
	(0.108)	(0.038)
One_child(Yes)	0.586***	-0.015
	(0.099)	(0.036)
Score	0.183***	0.035***
	(0.027)	(0.010)
Constant	4.891***	1.795***
	(0.311)	(0.132)
Observations	504	504
R-squared	0.484	0.615
r2_a	0.466	0.601
F	26.84	43.01

Notes: Model 28 (see Equation 28) changed the explained variable into student satisfaction based on Model 7. Model 29 (see Equation 29) added student satisfaction as an explanatory variable based on Model 7.