

## Empirical Research and Model Building about Customer Satisfaction Index on Postgraduate Education Service Quality

### LA RECHERCHE EMPIRIQUE ET LA CONSTRUCTION DE MODELE SUR L'INDEX DE SACTIFICATION DE LA CLIENTELE SUR LA QUALITE DU SERVICE DE L'EDUCATION POSTDOCTORALE

YAO Huili<sup>1,\*</sup>; YU Jing<sup>2</sup>

<sup>1</sup> Professor, Master's supervisor, School of Economics and Management, Jiangsu University of Sciences and Technology, Jiangsu, Zhenjiang, China.

<sup>2</sup> School of Economics and Management, Jiangsu University of Sciences and Technology, Jiangsu, Zhenjiang, China.

\* Corresponding author.

Address: School of Economics and Management, Jiangsu University of Sciences and Technology, Jiangsu, Zhenjiang, 212003, China

Received 6 December 2011; accepted 12 February 2012.

#### Abstract

In this paper, we build a customer satisfaction index model about postgraduate education service quality by using Structural Equation Modeling method, and proposes improvement measure from microscopic viewpoint.

**Keywords:** Postgraduate Education; Customer Satisfaction Degree; Structural Equation Modeling

#### Résumé

Dans cet article, nous construisons un modèle d'indice de satisfaction des clients sur la qualité de l'éducation post-universitaire de service en utilisant la méthode structurale modélisation par équation, et propose mesure visant à améliorer du point de vue microscopique.

**Mots-clés:** Formation postdoctorale; Degré de satisfaction des clients; Modélisation par Les structures d'équations

YAO Huili, YU Jing (2012). Empirical Research and Model Building about Customer Satisfaction Index on Postgraduate Education Service Quality. *Canadian Social Science*, 8(1), 108-113. Available from: URL: <http://www.cscanada.net/index.php/css/article/view/j.css.1923669720120801.1500> DOI: <http://dx.doi.org/10.3968/j.css.1923669720120801.1500>

#### INTRODUCTION

Postgraduate education is the highest level of education,

and it's responsible for training and selection of an innovative spirit and practical ability of high-level academic research and expertise of the task. With the expansion of postgraduate education, its quality is increasingly becoming the focus of attention. Postgraduates, as the customers who directly receive services, their actual perception did not attract enough attention and graduate student-oriented satisfaction model also was not established. Therefore, it has important reference value to enrich the theory of postgraduate education quality management and improve graduate management.

Study abroad in student satisfaction has made a lot of development, such as the United States, SSI scale (Mohammad S. Owlia, 1996, p12), NSSE evaluation (National Survey of Student Engagement) and so on. These methods can help us to understand the overall satisfaction levels of students. Paula Y • K • Kwan obtained by factor analysis that the quality of higher education included seven dimensions which are course content, attention to student, teaching facilities, assessment, guidance, social activities, and personnel (Paula Y.K. Kwan, 1996, p.25). The empirical results of Firadus held that the quality of higher education consisted of four dimensions: academy, non-academy, reliability, and empathy (Napaporn Khantanapha, 2000).

Domestic scholars have carried out a satisfaction survey, and they have also explored the evaluation index system and achieved certain results. Liu Junxue (Liu Junxue, 2006, p.91), conducted the satisfaction investigations of 1500 students from 12 provincial universities in the same province. Hu Xiaohui proposed to build customer satisfaction measurement system for colleges and universities, and built the "perceived quality" evaluation system (Hu Xiaohui, 2006, p.33). Li Ke designed a university student studying satisfaction survey indicator system, and conducted questionnaires among students in four universities in Changsha (Li Ke, 2007, p.89). Zhao Huili drew on the "implementation of American universities' students

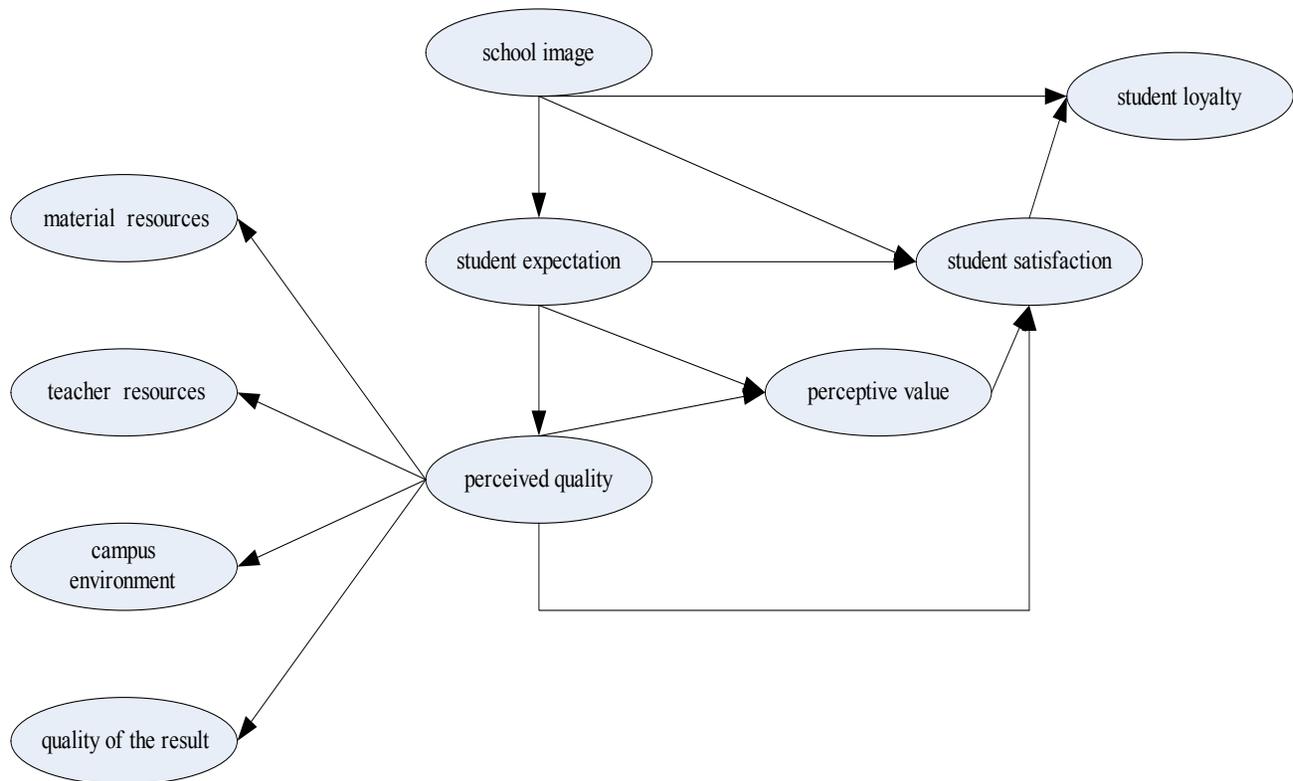
satisfaction scale “,selected the five universities in Beijing to conduct empirical research(ZHAO Huili, 2009, p.94). Lu Haiying used SERVQUAL model to research the perception quality of education service, the results showed that , SERVQUAL model was feasible as a student satisfaction survey method (LU Haiying, 2010, p.26).

Domestic scholars’ study has two shortcomings in this research area. Firstly, the field of study is focused on undergraduate education, and research on graduate education is carried out less. Secondly, there are many differences in the designing of the index systems, which is not scientific enough.

## 1. MODEL BUILDING ABOUT CUSTOMER SATISFACTION INDEX ON POSTGRADUATE EDUCATION SERVICE QUALITY

In this paper, the model (see figure.1) inherits the core concepts and structure of ECSI model, such as school

image, students’ expectations, perception quality, perception value, students’ satisfaction and student loyalty. At the same time, this paper also adds four variables, which are the material resources, teacher resources, campus environment and the quality of the result. Among them, material resources refer to the graduate students’ evaluation of all kinds of hardware facilities which are contacted with in the study and life process. Teacher resources refer to the graduate students’ evaluation of the teachers and instructors’ academic level and professional spirit. Campus environment refers to the graduate students’ evaluation of academic environment and cultural environment. The quality of the result refers to the graduate students’ evaluation of the gains of the aspects of their knowledge, ability, quality and psychological cheerful level after the postgraduate learning. Adding the four variables, we can get the macro data of the satisfaction degree and also can get micro quality improvement information after a survey. It is convenient to measure the influential factors of student satisfaction from the micro perspective, and find the foothold for school’s improvement service measures.



**Figure 1**  
**The Initial Model of Customer Satisfaction Index Model about Postgraduate Education Service Quality**

The initial model includes 14 hypothetic relations. The school image is an exogenous variable, and it has a directly positive influence on the student expectations, student satisfaction and student loyalty. The student

expectations have a directly positive influence on the perception quality, perceptive value and student satisfaction. Perception quality has a directly positive influence on the perceptive value and student satisfaction.

Perceptive value has a directly positive influence on the student satisfaction. The postpositional factor of the student satisfaction is the student loyalty. The student satisfaction has a directly positive influence on the student loyalty. In addition, perception quality has a directly positive influence on four quality factors, which are the material resources, teacher resources, campus environment and the quality of the result.

## 2. THE TEXT OF CUSTOMER SATISFACTION INDEX ON POSTGRADUATE EDUCATION SERVICE QUALITY

### 2.1 The Collection of Data

Between May and June in 2011, we conducted a questionnaire survey. 600 questionnaires were distributed and 557 questionnaires were recovered. Among which, 486 questionnaires are valid, and its effective recovery rate is 81%. The number of male in the students surveyed is 279 and accounts for 57.4%. The number of female is 207 and accounts for 42.6%.

The questionnaire of Satisfaction Index of postgraduate totally is designed 58 items. Among them, four items are about image of the school, five items are about student expectation, two are about perception quality. Perceived value includes three items, the student satisfaction contains 7 items, student loyalty consists of four items, material resources includes seven items, faculty power

includes eight items, campus environment consists of fourteen items, quality of results involves four items. This questionnaire used the Likert 5 Scale.

### 2.2 The Analysis of Reliability and Validity

In this paper, analysis method of structural equation model is used to exam the reliability and validity of the questionnaire. Here reliability is expressed by composite reliability of potential variable. The validity is expressed by extraction amount of the average variance of potential variable.

Composite reliability is mainly to evaluate the degree of consistency of a set of the indicators of potential construction. The higher it is, the higher relevance among measurement indexes is. Bogozzi and Yi (1988) suggested that composite reliability of potential variables above 0.6 is better. Convergent validity refers to that the test indicators of the same potential (construct) will fall on the same common factor, in general, it is represented by extraction amount of the average variance. The ideal standard is higher than 0.5.

As we can see from the table 1, the composite reliabilities of 10 potential variables are higher than the standards of 0.6, therefore, the reliability of the scales as a whole, is better. Among 10 average variance extracted of potential variables, with the exception average variance extracted of perceived quality which is 0.461, lower than the standard of 0.5, the remaining are greater than 0.5. Therefore, convergent validity of scales as a whole is better.

**Table 1**  
**The Result of Reliability and Validity**

Latent variable	Number of variable	Composite reliability	Average variance extracted
Image of the school	4	0.915	0.728
Student expectation	5	0.938	0.547
quality of precipitation	2	0.817	0.461
Perceived value	3	0.908	0.767
the student satisfaction	7	0.912	0.600
student loyalty	4	0.853	0.601
material resources	7	0.894	0.548
faculty power	8	0.905	0.548
Campus environment	14	0.95	0.579
quality of results	4	0.881	0.65

### 2.3 Fix Index and Path Coefficient

This paper uses AMOS7.0 software as a tool for establishing structural equation model. It is generally

considered that  $\chi^2/DF$  among 1~3 indicates that fit index of the model is good. The smaller RMR is, the better the fit index is. It is acceptable that RMR is lower than 0.05.

RMSEA values is above 0.10 ,the fit index of the model is poor, among 0.08 and 0.10 , it is passable, among 0.05 and 0.08,it indicates that the model is good, less than 0.05, it indicates that the model is very good. GFI, CFI, NFI values are between 0~1, the closer to 1 the values are, the better the fit index of the model is. The values higher than 0.9 indicate the model path chart has a good fit with the actual data.

As we can see from the figure,  $\chi^2/df$  is equal to 3.040 and is close to 3, RMSEA is equal to 0.065 and between the 0.05 and 0.08, CFI is equal to 0.870, NFI is equal to 0.818 and is close to 0.9, GFI is equal to 0.741, lower than the standard of 0.9, RMR is equal to 0.139, higher than the standard of 0.05, so the fit indices of the initial model instructed in this paper is acceptable.

**Table 2**  
**The Test of Fit Index from the Initial Model**

$\chi^2$	df	$\chi^2/df$	P	RMR	RMSEA	GFI	CFI	NFI
4779.234	1572	3.040	0.000	0.139	0.065	0.741	0.870	0.818

Completing the hypothesis testing of the model, we can see path coefficient estimation results from table 3, among 14 items in the path, apart from MY ← QW path coefficient is negative, and the remaining 13 paths are positive numbers.

Significance testing on path coefficients by p value shows that 12 paths coefficient comes up to the standard of significance text of 0.01. The p value of JZ ← QW path

coefficient is 0.036, although it does not come up to the standard of 0.01, the critical ratio (C.R) 2.101 is greater than 1.96, achieving significant standard of 0.05.

Therefore, among the 11 assumptions, with the exception of "H6 student expectation has a direct positive impact on students' satisfaction ", the remaining 13 assumptions are accepted.

**Table 3**  
**The Result of Path Coefficient and Hypothesis Testing**

Assumption	Path	Standard estimated value	Critical ratio(C.R)	P	Test results
H1 Image of the school has a directly positive impact on student expectation	QW←XX	0.539	10.613	***	accept
H2 Image of the school has a directly positive impact on student satisfaction	MY←XX	0.298	7.775	***	accept
H3 Image of the school has a directly positive impact on student loyalty	ZC←XX	0.384	9.650	***	accept
H4 student expectation has a directly positive impact on quality of precipitation	ZL←QW	0.533	10.792	***	accept
H5 student expectation has a directly positive impact on perceived value	JZ←QW	0.086	2.101	0.036	accept
H6 student expectation has a directly positive impact on student satisfaction	MY←QW	-0.034	-0.796	0.426	reject
H7 quality of precipitation has a directly positive impact on Perceived value	JZ←ZL	0.755	16.122	***	accept
H8 quality of precipitation has a directly positive impact on student satisfaction	MY←ZL	0.544	9.217	***	accept
H9 Perceived value has a directly positive impact on student loyalty	MY←JZ	0.217	3.886	***	accept
H10 students' satisfaction has a directly positive impact on student loyalty	ZC←MY	0.580	13.853	***	accept
H11 quality of precipitation has a directly positive impact on material resources	WZ←ZL	0.887	—	—	accept
H12 quality of precipitation has a direct positive impact on faculty power	SZ←ZL	0.907	13.737	***	accept
H13 quality of precipitation has a directly positive impact on Campus environment	HJ←ZL	0.956	21.164	***	accept
H14 quality of precipitation has a directly positive impact on quality of results	JG←ZL	0.812	15.821	***	accept

### 3. THE RESULT OF CUSTOMER SATISFACTION DEGREE OF GRADUATES EDUCATION SERVICE QUALITY

#### 3.1 The Index of Customer Satisfaction Degree of Undergraduates Education Service

This paper uses the centesimal grade to describe the potential variable CSI—Customer Satisfaction Index. When the customers feel fully satisfied, we choose  $CSI=100$ . Otherwise, when the customers feel fully dissatisfied, we choose  $CSI=0$ . We choose a real number  $CSI=0\sim 100$  to indicate the general satisfaction that  $CSI\in(0,100)$ . The formula for customer satisfaction index is described as (Liu Xinyan, 2004).

$$CSI = \frac{E[\xi] - \text{Min}[\xi]}{\text{Max}[\xi] - \text{Min}[\xi]} \times 100$$

$\xi$  represents potential variable customer satisfaction,  $E[\cdot]$ ,  $\text{Min}[\cdot]$ ,  $\text{Max}[\cdot]$  represent the average potential variables of customer satisfaction, minimum values and maximum values.

According to the above formula for customer satisfaction index (CSI), we can calculate that the graduate education student satisfaction index is 62.61. With the same way, we can calculate the index vector of other potential variables. School image is 59.1, student expectations is 73.28, perceived quality is 60.31, perceived value is 66.26, student loyalty is 60.16, material resources is 56.28, faculty power is 66.80, campus environment is 60.51 and outcome quality is 69.06.

Learning from the whole, the customer satisfaction degree of graduate education service quality in this school is at middle level.

The index of three potential variables, school image, material resources and campus environment, is low, which indicates that it is necessary to strengthen investment in hardware of schools, improve aspects of school management in software, further highlight the features of the school education and set the school brand in the external image. From the index of perceived quality, perceived value and the results quality, the index of perceived value and results quality is significantly higher than that of perceived quality, which indicates although the perceived value of graduates' attitude towards the quality of education service is not bad, compared with the money, energy, opportunities, it is worth to gain the expertise and capacity. The index of teacher resource is the highest in the three indexes of material resource, teacher resource and campus environment, which indicates graduates are acceptable of the responsibility and academic level of the instructors. From the index of student expectation and perceived quality, the index of student expectation is

significantly higher than that of perceived quality, which indicates graduate education of this school is far from the service quality of graduates' psychological expectations.

#### 4. SUGGESTIONS ON IMPROVING THE CUSTOMER SATISFACTION DEGREE ON POSTGRADUATE EDUCATION SERVICE QUALITY

In this paper, The result shows that the learning purpose of postgraduates in this university is clear, and their requirements of the study material are higher than that of the living material, therefore, the university needs to improve the investment to the laboratory equipment, books data, digital resources, scientific research and the research funds in order to meet the needs of the postgraduates.

It shows that postgraduates are confirmed to the tutors' academic level, responsibilities and communications between teachers and students, and the education managers should pay more attention to the course phase, set reasonable graduate course according to the demand of social development in a scientific and rational way, and also need to consider the depth and breadth, combine the features of basis with frontier, in addition, teachers should pay attention to the diversity of teaching methods, avoid repeating, and express clearly when they control the teaching process.

The scores of the 14 Campus environment observation variables are between 3 and 4 point, a level between general and satisfied. Score of the psychological consultation and guidance is the lowest, just 3.25, this shows more attention should be paid to students' mental health, consultations and lectures related to mental health should be offered in order to provide help when students meet the pressure of life and study. According to the weight, the highest three were the freedom of students expressing their opinions, the timeliness of students getting help when they meet difficulties, the feedback and treatment after students making their complaints. The three are related to the interaction between students and their schools. It shows that schools shall make promptly response when students report the situation. In the three, the lowest is the feedback and treatment, just 3.18. It shows that this school have not done enough currently, more attention need to be paid to students' reasonable requirements and suggestions, and inform students of the result promptly.

#### LIMITATIONS AND FUTURE RESEARCH

Considering the limited conditions, we research the customer satisfaction degree on postgraduate education service quality of just one university in this paper.

Evaluation and comparison of the satisfaction degree between universities are beyond our research. On the university types, we choose the university in science and engineering, not the comprehensive university. On the evaluation objects, we ignore the differences between genders, grades, students who choose this university themselves or are adjusted to this university, and the degree to which students are interested in their majors. Whether these factors would affect the satisfaction to schools still needs our research in the future.

---

## REFERENCES

---

- Mohammad S. Owlia, & Elaine M. Aspinwall (1996). *A Framework for the Dimensions of Quality in Higher Education*. New York: Quality Assurance in Education.
- Paula Y. K. Kwan (1996). Application of Total Quality Management in Education, Retrospect and Prospect. *International Journal of Educational Management*, 10, 25-35.
- Napaporn Khantanapha (2000). *A Empirical Study of Service Quality in Part-time MBA Programs in Private and Public University in Thailand*. Nova Southeastern University, Thailand.
- LIU Junxue, LI zhenghui & ZHAO Xionghui (2006). The Empirical Research on the Influential Factors and Extent of Students' Satisfaction Degree. *High-level Education Research*, 11, 91-97.
- HU Xiaohui (2006). The Initial Research on Customers' Satisfaction Degree of High-Level Education. *The Journals of National Education and Administration College*, 5, 33-37.
- LI Ke (2007). The Investigation on University Students' Satisfaction. *Coal High-Level Education*, 5, 89-91.
- ZHAO Huili, XIN Lingling (2009). The Analysis on University Students' Satisfaction in the Capital. *Beijing University of Posts and Telecommunications*, 12, 94-99.
- LU Haiying (2010). The Empirical Research on SERVQUAL Model to the Service Assessment of Undergraduate Education Quality.—the Case Study of a University. *High Agricultural Education*, 7, 26-30.
- LIU Xinyan (2004). *The Study on Customers' Satisfaction Degree Index Model*. Wuhan: Chinese Financial and Economic Publishing Company.