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Factors Affecting Satisfaction and Loyalty of Social Science Students in A Public University In Shanxi, China

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Abstract

Purpose: This study aims to determine the impacting factors of satisfaction and loyalty among students majoring in social science at public universities in Shanxi Province. The conceptual framework proposes causal relationships among built environment, teaching care, university image, student trust, academic aspects, student satisfaction, and student loyalty. **Research Design, Data, and Methods**: A quantitative method was used to distribute questionnaires to 500 students majoring in science and technology at the Taiyuan Institute of Technology. The sample techniques were purposive, stratified random and convenience sampling. Before the data collection the Item Objective Congruence (IOC) and Cronbach's alpha were used to test to ensure the validity of the content. Confirmatory factor analysis (CFA) was used to analyze the data, including model fit, reliability, and validity. Structural equation modeling (SEM) was conducted to test hypotheses. **Results**: The built environment has a significant influence on student satisfaction and teaching care. The built environment, teaching care, university image, student trust, and academic aspects significantly affect student satisfaction toward loyalty. **Conclusion**: The results implied that universities could pay attention to their strategic development to improve the facilities, student relationship, university image, academic aspects, and trust, which will help to enhance students' satisfaction and loyalty.

Keywords: Student Satisfaction, Student Loyalty, University Image, Trust, Academic Aspects

JEL Classification Code: M15, M21, M31, P23

1. Introduction

China's higher education has overtaken Russia, India, and the United States to become the world's largest. On the one hand, the rapid expansion of college enrollment in China deserves recognition. It makes higher education no longer exclusive to ethnic minorities and gradually removes the cloak of "Luxury goods," which will improve Chinese people's quality of education. On the other hand, the surge in the number of students brings the danger of dilution to the limited resources of teachers, teaching facilities, and so on, which poses a severe challenge to the guarantee of the quality of running a university. The flood of new students on campus will inevitably mean a corresponding surge in graduates. However, in sharp contrast to the increase in the number of highly educated people, the employment mentality of college students is declining yearly in the face

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of the cruel reality. In some places, college graduates are competing for high-demand jobs (Global Times, 2022).

The current situation that graduates cannot find ideal jobs and employers cannot recruit suitable employees makes all parties of society more and more strongly responsible for the quality of university education. In this context, the evaluation results of university quality are highly concerned by all walks of life and even become one of the important reference indicators for students to choose schools. However, the evaluation methods and angles of the quality of running colleges and universities in China are relatively simple. Whether it is the official teaching evaluation organized by relevant departments of the Ministry of Education or the ranking activities initiated by private education websites, the number of published papers, the number of scientific research achievements, and the employment rate of graduates are the yardsticks to measure the quality of a university. The disadvantage of this method is that it ignores students, the direct customer group of the university, who are called the lifeline of the university. Therefore, colleges and universities can achieve sustainable development only when they truly understand and meet students' needs. Based on the above analysis, the author believes that carrying out the survey and research on Chinese college students' satisfaction is the objective demand of universities, students, and society and is to maximize the interests of college students (Song, 2022).

The students' satisfaction refers to a psychological feeling of happiness, pleasure, or disappointment that college students, as customers who are served by higher education, have in comparing their gains from higher education services with their expectations. America and Britain attach great importance to evaluating and researching college students' satisfaction. With the popularization of higher education in China, there is more research on college students' satisfaction. As far as the current progress is concerned, a scientific evaluation system of college students' satisfaction has yet to be established. Based on the successful experience of foreign countries, this paper explores the factors that affect the satisfaction and loyalty of college students in China, combined with the practice of satisfaction evaluation of college students in China. Thus, this paper explores the factors that affect students' satisfaction and loyalty in public undergraduate colleges in Shanxi Province. The paper contributes to colleges and universities which can help them to improve environment, attaching importance to the teaching service and quality, strengthening the image building of colleges and universities, and further reforming the teaching and management mode, to effectively improve the satisfaction and loyalty of college students and enhance the competitiveness of running colleges and universities.

2. Literature Review

2.1 Built Environment

Building environment identified the following aspects: appearance, comfort, configuration, function, work type, and personal relationship. University investment, such as investment in the built environment, may affect perceived price through university registration fees, such as tuition fees, flexible tuition fees paid, and flexibility of approaching tuition fees (Graciola et al., 2018).

Therefore, price is a factor that will affect students' access to specific universities and continuing their studies (Walsh et al., 2015). Economic factors play a vital role in students' choices (Bergerson, 2009). If you decide to enroll in university courses, it may affect students studying in the next three or four years and their future career prospects for a long time. In a course after choosing a university, these elements and their results are recorded in the course of graduates and transported as indelible marks related to individuals (Walsh et al., 2015). Customers spend their money to get the benefits of the purchased and expected services and the fair price of the services provided (Podhorsky, 2015).

However, the sense of fairness is determined by the position of the observers (customers or suppliers) and their past market experience. Fairness refers to the customer's assessment of whether the supplier's price is reasonable, acceptable, or reasonable compared with the competitor's price (Campbell, 1999). Customers' environment and past shopping experiences are price fairness perceptions (Bissinger, 2019). Therefore, the service provider environment can affect price perception and fairness (Graciola et al., 2018).

Building environmental assessment provides quality benchmarks for the service and performance of various business environments (Hassanain & Iftikhar, 2015; Sanni-Anibire & Hassanain, 2016) and guides the improvement of future development (Wu et al., 2018). Marcia (2011) classified it as Built Environment because, according to these authors, the built environment can be managed and controlled. It is necessary to rethink the university space to ensure that the environment is conducive to students' experience and satisfaction (Neary et al., 2010). Physical learning space affects college students' satisfaction and teaching support (Perks et al., 2016). Hence, hypotheses are built:

H1: Built environment has a significant impact on student satisfaction.

H2: Built environment has a significant impact on teaching care.

2.2 Teaching Care

Students' overall development is the teaching's main goal (Martinez et al., 2017). If the service provided by teachers for students creates value for them, the result exceeds students' expectations, who will be satisfied (Oliver, 2014). They emphasized that teaching performance and the teacher's role affect student satisfaction. In addition, teachers greatly influence students' overall satisfaction, and related elements of the BIJ teaching method positively contribute to student satisfaction (Santini et al., 2017). In addition, consulting support includes accessibility, reliability, and professionalism, and response and understanding are important factors of student satisfaction (Parahoo et al., 2016). In addition, when skills are developed, whether general or transferable, skills or professional skills are crucial to students' possible employment prospects. Therefore, it becomes an understandable satisfaction factor for students (Poon, 2019).

Consumer sovereignty theory. Consumer sovereignty, also known as a consumer first, describes consumers and production in western economics—a concept of the relationship between people. Under the market economy, the consumers of education are students or students. Parents and educators must meet their needs. With the rapid development of science and technology, people's material life and the requirement of students and parents for education are increasingly diversified, personalized, and multi-layered. In this way, education providers must quickly capture market information to meet the needs of education consumers. However, at present, China's higher education is still in the seller's market for the time being and has not fully realized the dominant position of college students' consumers. Colleges and universities are slow to respond to market demand, and the students they cultivate need to be in touch with market demand, lacking competition consciousness and spirit. In the 21st century, when the internationalization of higher education is deepening, if this situation continues, it will seriously impact the existence of colleges and universities in China. Based on the above evidence, this study can hypothesize that:

H3: Teaching care has a significant impact on student satisfaction.

2.3 University Image

Fram (1982) first put forward the concept of university image. Based on the corporate image at that time, it became a hot topic in higher education research. It was derived from the corporate image then and became a hot topic in higher education research. Due to the non-profit characteristics of higher education, the development could be faster, and so far, there is no unified opinion on the concept of university image.

Image is the premise and foundation of the concept of college image. Although there is no unified understanding of the concept of the image, it is believed that image is a psychological cognition of something formed by human perception, that is, the overall impression, and this cognition is applied to practice, which contains subjective factors such as people's views and evaluations on things (Capriotti, 1999). The school image is a comprehensive impression, usually including an opinion on the school infrastructure, curriculum arrangement, teaching quality, and cost-effective tuition fees (Fram, 1982). Liu (2003) indicated that the university image mainly consists of external and internal images. Visible things, such as campus scenery and public activities, embody the external image.

In contrast, the internal image is mainly embodied by invisible things such as university spirit and internal advantages. Then the corresponding research also defines the image of colleges and universities from the public's perspective. Li (2007) argued that the image of colleges and universities in the mental outlook reflected in the process of running schools and the satisfaction of students. Therefore, a hypothesis is derived:

H4: University image has a significant impact on student satisfaction.

2.4 Student Trust

Student trust is a kind of interpersonal relationship. Zhang (2010) defined the trust between teachers and students as the relationship between teachers and students in the process of education and teaching, based on mutual evaluation through the expectation of each other's statements, commitments, and behavioral reliability. This study holds that student trust is a series of psychological states and behaviors in which one teacher and student believes that the other teacher and student will act according to their psychological expectations based on limited information in a specific situation of teacher-student education activities so that they are willing to take risks to share their real situation or make commitments between teachers and students.

The first experimental study of trust began in 1958 when Deutsch designed and conducted the Prisoner's Dilemma experiment, which stated that trust refers to "an individual's expectation about a factor that affects his or her perception and that the individual will act accordingly to the situation". Suppose the expectation is positive and in the same direction as the outcome of the individual's behavior. In that case, the individual can have a positive emotional experience, and if not, the individual can have a negative emotional experience (Deutsch, 1958).

Rotter (1967) defined trust as the general expectation that others will keep their promises. By repeatedly

discovering the reliability of each other's words or promises, individuals learn to expect a certain partner to keep his promise in the future. This expectation is generalized to other social objects and becomes general interpersonal trust. Therefore, trust is a post-emergence and cognitive rather than sensory, rational rather than pre-logical, and concrete rather than generalized personality, which determine satisfaction. Rempel and Holmes (1986) further studied the issue of trust and pointed out that trust is an integral part of forming intimate relationships, which affects satisfaction. On this basis, A "three-person game" experiment was conducted and found that the level of individual, interpersonal trust could affect the solution of problems. Individuals with high interpersonal trust also had stronger communication ability, and one of the important ways to solve problems was to have better communication ability (Moore & Shaffer, 1987). Accordingly, a hypothesis is proposed:

H5: Student trust has a significant impact on student satisfaction.

2.5 Academic Aspects

Higher education service theory. The theoretical basis of studying college students' satisfaction in this paper is that higher education is a kind of service. Many scholars believe that higher education is a kind of service. Its basic output is educational service rather than the products (college students) produced in the so-called workshops (colleges and universities). The higher education product is a kind of knowledge-based product, which should be based on whether it can meet the development needs of students. Among them, the traditional "student product view" turns to the "service product view." Education service is the product of the education department, the producer of education service is the educator, and its consumer is the educated (Zhang, 2010).

Zhang (2010) argued that higher education service includes two levels: first, indirect service, which refers to the overall service for society. Higher education aims at adapting to and meeting the practical needs of social politics, economy, and science and technology and provides academic and technology-intensive services to society purposefully and in a planned way, based on the training of senior specialized talents and the development of scientific knowledge. The second is direct service, which refers to individual service for college students and postgraduates. Through classroom teaching, scientific research, and social practice activities (all forms of explicit or implicit education) under the guidance of teachers or tutors, higher education provides knowledge-based and intelligent development services to college students and postgraduates in an organized and systematic way.

Yang (2003) signified that the product of education is service. In the service product classification (CPC) of the United Nations Statistics Department, education belongs to the second middle category of the ninth category community, social and personal services. In the classification of the service industry by ISO, education is the eighth category. In the scope of China's certification and accreditation business, education is also subordinate to the service industry. From the above analysis, it can be seen that education is regarded as a kind of service industry, regardless of the views of scholars or various authoritative documents and regulations. Thus, academic aspects has a significant impact on student satisfaction per indicated:

H6: Academic aspects has a significant impact on student satisfaction.

2.6 Student Satisfaction

Michael (2003) noted that student satisfaction refers to students' subjective experience in college and their perception of the value of the education experience. It is a subjective evaluation related to the teaching quality of the school and the student's personal experience in the school, including location, environment, convenience, social reputation, etc. Student satisfaction is a subjective evaluation of students' preference for different results and experiences related to education (Oliver & Desarbo, 1989).

College student satisfaction refers to the situation formed by students' perception of colleges and universities compared with their expected value of schools. It usually includes four levels: concept satisfaction, behavior satisfaction, audio-visual satisfaction, and service satisfaction (Brown & Mazzarol, 2009). It is considered that the satisfaction of college students refers to a psychological state in which students are happy or disappointed in comparing their harvest after receiving higher education with their expectations (Alves & Raposo, 2010). College students' satisfaction refers to their general psychological feelings and personal views on their studies and life during their studies.

Lin (2007) believes that colleges and universities are units that train talents and provide educational services. Students are customers in the education process. Customers will compare their gains and expectations, forming a state of happiness or disappointment. However, some scholars believe that education is different from ordinary goods. It is an interactive process between students and schools and can refer to more than just the satisfaction of consumers. According to Niu (2005), student satisfaction is closely related to students' health, behavior, and mentality, which is an emotional point of view.

The degree of satisfaction varies greatly with students' personalities. Students often have their own "internal

standards" and "internal satisfaction," which are influenced by students. There is a great deal of uncertainty about the school's expectations or the influence of others before enrolling. Students will use these criteria to measure their university's evaluation indicators, which cover various aspects so that psychology can affect satisfaction and loyalty. In education, students are full. A degree is an objective evaluation made by students according to their own learning experience and final education results (Giner & Rillo, 2016). To achieve high student satisfaction and loyalty, schools should understand the real needs of students and provide them with excellent value (Di Marzo et al., 2005). College students' satisfaction is a psychological feeling of happiness, pleasure, or disappointment generated by college students, as customers of higher education services, in comparing the harvest and expectation of school education services (Boria, 2004). Hence, a hypothesis isproposed:

H7: Student satisfaction has a significant impact on student loyalty.

2.7 Student Loyalty

Continued purchase behavior is a long-term and stable relationship between buyers and sellers (Liu & Jia, 2006), mainly reflected in high attitude and repurchase behavior (Wang & Feng, 2002). The highest pursuit of enterprises is the sustainable loyalty of target customers, which is the unity of customer behavior loyalty and attitude loyalty (Huang, 2011). Customer behavior loyalty is mainly manifested in customers repeatedly buying products and services and recommending them to relatives and friends. It is the behavior that customers are willing to buy these products and services again and try other products or services under a certain brand after feeling the products and services of that brand (Kim et al., 2004). It is the possibility of customers repeatedly using and inquiring about products and services in a certain period in a specific field (Brown & Mazzarol, 2009). Customer attitude loyalty is a specific purchase behavior formed by customers through a certain psychological process, and it is to maintain the preference and sincerity for specific products after the promoters of other products/services introduce new products and services (Jacoby & Chestnut, 1978), which Keller also supports, He believes that customer loyalty is the approval and support of a certain brand, and this attitude is precisely the customer loyalty expressed by the customer's satisfaction with the brand formed in the continuous repurchase (Keller, 1993)

Based on the definition of customer loyalty, combined with the views of academic circles on student loyalty, this study attempts to describe the concept of student loyalty in this study briefly; student loyalty is the positive emotional connection between students and the school they attend, the trust in the school and the willingness to publicize the responsibility of the school, and the intention of going back to school to buy school services again (Wang, 2014). It is the initiative to recommend relatives and friends to study in the school (Brown & Lucas, 2009), which shows various favorable behaviors to promote the development of the school.

Dick and Basu (1994) focused on customer loyalty from three aspects: behavior, intention, and emotion. They are divided into behavioral loyalty, intentional loyalty, and emotional loyalty. Loyalty is the repeated purchase of products or services by customers, Strongly recommending the product to your relatives and friends, and showing your loyalty to the product with practical actions; Emotional loyalty refers to customers having a high degree of recognition of this product, even if other salespeople sell products to them, they will not be tempted, and they will tell them Others promote this product and have a sense of dependence on the product or service; Loyalty means that customers have the intention to buy, However, due to the interference of their conditions or other information, there is no clear intention to buy, but the purchase of products Buy within the customer's choice. This classification emphasizes the importance of behavioral loyalty and all business activities of enterprises. All should be linked with customers' behavioral loyalty, and only behavioral loyalty can create profits for the company. The classification is also an important basis for enterprises in the practical operation of loyalty management. Effective measures should be taken to make customers' emotions turn loyalty into behavioral loyalty.

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework is developed from studying previous research frameworks. It draws on four theoretical models in relevant to student satisfaction and loyalty (Ali et al., 2016; Bertalmio et al., 2021; Chen, 2016; Weerasinghe & Fernando, 2018). This paper explores the factors that affect students' satisfaction and loyalty in public undergraduate colleges in Shanxi Province. The conceptual model comprises seven variables: built environment, teaching care, university image, student trust, academic aspects, and student satisfaction and student loyalty as shown in Figure 1.

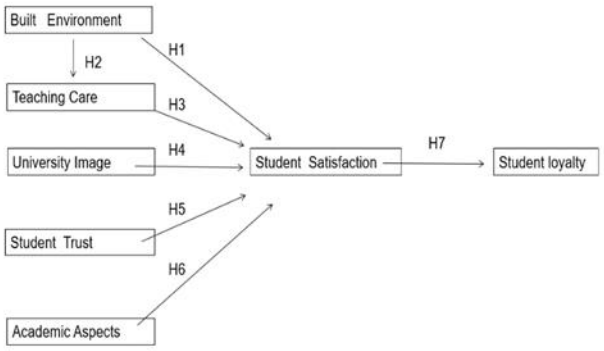

Figure 1: Conceptual Framework

H1: Built environment has a significant impact on student satisfaction.
H2: Built environment has a significant impact on teaching care.
H3: Teaching care has a significant impact on student satisfaction.
H4: University image has a significant impact on student satisfaction.
H5: Student trust has a significant impact on student satisfaction.
H6: Academic aspects has a significant impact on student satisfaction.
H7: Student satisfaction has a significant impact on student loyalty.

3.2 Research Methodology

This study collected the data from the first-year to seniors' students, majoring social science of Taiyuan Institute of Technology in Taiyuan City, Shanxi Province. The research tools include selecting the target population, sampling unit, and sample size. In this study, questionnaires were distributed through online and offline channels. Before data collection, the Item Objective Congruence (IOC) was proven by three experts, resulting all scale items were reserved at a score of 0.6 and above (Turner & Carlson, 2003). Furthermore, Cronbach's alpha was used to test reliability, resulting with all construct were passed at value greater than 0.70 (Nunnally & Bernstein, 1994). Structural equation modeling (SEM) and confirmatory factor analysis (CFA) were used to analyze the data, including model fit, reliability, and validity tests.

3.3 Population and Sample Size

Cooper and Schindler (2011) pointed out that the target population should include people, records, and events related to the research objectives. Therefore, the target population of this study is undergraduates in an undergraduate college in Shanxi Province, China. Kline (2011) indicated that the sample size for structural equation modeling should be between 200 to 500. This study distribute questionnaire to 1,000 students. However, the returned questionnaire after the screening was 500 respondents.

3.4 Sampling Technique

Gill et al. (2010) determined sampling unit is considered the object that can be selected from the target population in the study. In this study, the sample techniques were purposive, stratified random and convenience sampling. For purposive sampling, the sampling unit comprises students from year one to four at Taiyuan Institute of Technology in this study. The researcher uses the quantitative research method of multi-step sampling to distribute the questionnaire to students through online and offline channels. As shown in Table 1, number of students majoring in social science at the Taiyuan University of Technology were calculated per the year of study into subgroup as stratified random sampling. The data collection is between April to August 2022. According to convenience sampling, the questionnaire was distributed through WeChat groups.

Table 1: Sample Units and Sample Size

Grade	Population Size of Natural Science majors	Proportion	Proportional Sample Size
Freshman	1000	26%	130
Sophomore	1042	27%	135
Junior Student	947	24.6%	123
Senior Student	867	22.4%	112
Total	**3856**	**100%**	**500**

Source: Created by the author.

4. Results and Discussion

4.1 Demographic Information

The sample of the target population is 500 participants, whose demographic characteristics are shown in Table 2. 63.8% of these respondents were male, and 36.2% were female. In terms of age, the largest group in the sample is 19-21 years old, accounting for 56.4%, 22-24 years old, accounting for 23.4%, 18 years old and below accounting for 19%,and more than 25 years old accounting for 1.2%.

Table 2: Demographic Profile

Demographic and General Data (N=500)		Frequency	Percentage
Gender	Male	319	63.8%
	Female	181	36.2%
Year of Study	18 years old and below	95	19%
	19-21 years old	282	56.4%
	22-24 years old	117	23.4%
	More than 25 years old	6	1.2%

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) was used to ensure each variable's items are significant, representing the factor load to test the convergent validity. Hair et al. (2006) emphasized the importance of factor loading for each project. The factor loading is required to be 0.5, and the coefficient of the P-value is lower than 0.05. In addition, according to Fornell and Larcker (1981), the cut-off pointed to CR greater than 0.7 and the AVE higher than 0.5. The results in Table 3 show that the values of CA were greater than 0.70 (Nunnally & Bernstein, 1994), factor loading are all above 0.5, CR is above 0.7, and AVE is above 0.5. It shows that the CFA test results are good, and the data analysis results are effective and reliable.

Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire	No. of Items	Cronbach's Alpha	Factors Loading	CR	AVE
Built Environment (BE)	Correa da Silva et al. (2021)	6	0.898	0.712-0.823	0.898	0.597
Teaching Care (TC)	Correa da Silva et al. (2021)	6	0.918	0.737-0.869	0.918	0.653
University Image (UI)	Weerasinghe and Fernando (2018)	3	0.847	0.789-0.835	0.848	0.651
Student Trust (ST)	Chen (2016)	3	0.858	0.800-0.829	0.859	0.670
Academic Aspects (AA)	Zhou et al. (2015)	4	0.866	0.739-0.827	0.866	0.619
Student Satisfaction (SS)	Zhou et al. (2015)	4	0.838	0.679-0.843	0.841	0.571
Student Loyalty (SL)	Zhou et al. (2015)	3	0.752	0.690-0.719	0.752	0.503

As shown in Table 4, the value obtained in this study is greater than the acceptable value, which verifies the good fitting effect of the model. CMIN/DF, GFI, AGFI, NFI, CFI, TLI, and RMSEA are used as indicators of model fitting in CFA testing. In addition, the measurement results of these models consolidate the effectiveness of discrimination and verify the effectiveness of subsequent structural model estimates.

Table 4: Goodness of Fit for Measurement Model

Index	Acceptable Values	Statistical Values
CMIN/DF	≤ 5.0 (Wheaton et al., 1977)	1.908
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.920
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.902
RMSEA	≤ 0.10 (Hopwood & Donnellan, 2010)	0.043
CFI	≥ 0.80 (Bentler, 1990)	0.961
NFI	≥ 0.80 (Wu & Wang, 2006)	0.923
TLI	≥ 0.80 (Sharma et al., 2005)	0.956
Model Summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, RMSEA = Root mean square error of approximation, CFI = Comparative fit index, NFI = Normed fit index, and TLI = Tucker-Lewis index

Source: Created by the author.

According to Table 5, the square root of the AVE of each variable is larger than its correlation coefficient with other variables, indicating that the discriminant validity of the model is very good. In addition, multicollinearity reflects independent variables in a regression model are correlated. As a results, this research has no multicollinearity issues.

Table 5: Discriminant Validity

	BE	TC	UI	AA	SS	SL	ST
BE	**0.773**						
TC	0.434	**0.808**					
UI	0.422	0.457	**0.807**				
AA	0.445	0.508	0.482	**0.787**			
SS	0.520	0.477	0.476	0.443	**0.756**		
SL	0.481	0.370	0.366	0.359	0.413	**0.709**	
ST	0.416	0.492	0.439	0.440	0.431	0.395	**0.819**

Note: The diagonally listed value is the AVE square roots of the variables

Source: Created by the author.

4.3 Structural Equation Model (SEM)

SEM is an important statistical method in social science research (Wang et al., 2022). The goodness of fit indices for the structural equation model (SEM) is measured as demonstrated in Table 6. The calculation in structural model by SEM and adjusting the model by using SPSS AMOS shows the results of the fit index as a good fit, which is CMIN/DF = 3.160, GFI = 0.850, AGFI = 0.819, RMSEA = 0.066, CFI = 0.907, NFI = 0.870, and TLI = 0.895, according to the acceptable values are mentioned in Table 6.

Table 6: Goodness of Fit for Structural Model

Index	Acceptable Criterion	Statistical Values Before Adjustment	Statistical Values After Adjustment
CMIN/DF	≤ 5.0 (Wheaton et al., 1977)	3.596	3.160
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.834	0.850

AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.805	0.819
RMSEA	≤ 0.10 (Hopwood & Donnellan, 2010)	0.072	0.066
CFI	≥ 0.80 (Bentler, 1990)	0.885	0.907
NFI	≥ 0.80 (Wu & Wang, 2006)	0.848	0.870
TLI	≥ 0.80 (Sharma et al., 2005)	0.874	0.895
Model Summary		**Not in harmony with empirical data**	**In harmony with empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, RMSEA = Root mean square error of approximation, CFI = Comparative fit index, NFI = Normed fit index, and TLI = Tucker-Lewis index

Source: Created by the author.

4.4 Research Hypothesis Testing Result

The research model measures the significance of the standardized path coefficient according to its t-value and calculates the explanatory ability of the independent variable to the dependent variable according to R2. Table 7 reports that at the level of significance p=0.05, H1 to H7 are supported.

Table 7: Hypothesis Testing Result

Hypothesis	(β)	t-Value	Result
H1: BE → SS	0.337	7.066*	Supported
H2: BE → TC	0.381	8.410*	Supported
H3: TC → SS	0.260	5.390*	Supported
H4: UI → SS	0.297	6.385*	Supported
H5: ST → SS	0.172	3.815*	Supported
H6: AA→ SS	0.166	3.716*	Supported
H7: SS→ SL	0.568	8.330*	Supported

Note: * p<0.05

Source: Created by the author

The hypotheses testing results have presented in Table 7 and can be interpreted per below:

H1 proved that built environments significantly impact student satisfaction, with the standardized coefficient value of its structural path is 0.337.

The result of **H2** proved that built environment significantly impacts teaching care, with the standardized coefficient value of its structural path is 0.381.

H3 proved that teaching care significantly impacts student satisfaction, with the standardized coefficient value of its structural path is 0.260.

The standardized coefficient value of **H4** is 0.297, indicating that university image significantly impacts student satisfaction.

The standardized coefficient value of **H5** is 0.172. That is, student trust has a significant impact on student satisfaction.

The standardized coefficient value of **H6** is 0.166, indicating that academic aspects significantly impact student satisfaction.

Finally, the standardized coefficient value of **H7** is 0.568, reflecting that student satisfaction significantly impacts student loyalty.

5. Conclusions and Recommendation

5.1 Conclusion and Discussion

This study aims to investigate the influencing factors of student satisfaction and loyalty to public universities in Shanxi Province, China. The model consists of seven variables and seven assumptions. The subjects of the questionnaire were selected from four undergraduate-grade students majoring in social science at Taiyuan Institute of Technology, Taiyuan, Shanxi Province. The data analysis aims to explore the factors that affect student satisfaction and loyalty. Confirmatory factor analysis (CFA) is used to measure the validity and reliability of conceptual models. A structural equation model (SEM) was used to analyze the influence relationship proposed by the hypothesis.

The results are as follows. First, student satisfaction has a significant impact on student loyalty. This means that student satisfaction is the most significant factor affecting loyalty. A degree is students' evaluation according to their own learning experience and final education results can enhance loyalty (Boria, 2004; Di Marzo et al., 2005; Giner & Rillo, 2016). Secondly, university image has a significant impact on student satisfaction. It indicates that the better the school's image, the higher the student satisfaction (Li, 2007; Liu, 2003). Third, this study determined that built environment, academic aspects, and student trust significantly impact student satisfaction. The study also proved that built environment significantly impacts teaching care and student satisfaction. Neary et al. (2010) postulated that the environment is conducive to students' experience and satisfaction. Perks et al. (2016) added that physical learning space affects college student satisfaction and teaching support. Yang (2003) signified that academic aspects as the quality of a school can determine student satisfaction. Additionally, Moore and Shaffer (1987) supported those individuals with high interpersonal trust also had stronger satisfaction.

5.2 Recommendation

Through a survey of social science majors at Taiyuan Institute of Technology in Taiyuan City, Shanxi Province, this study explores the influencing factors of science majors' satisfaction and loyalty to public universities in Shanxi Province. We know that the key factors affecting students' satisfaction and loyalty are the built environment, teaching care, university image, academic aspects, and students' trust, among which the built environment significantly impacts teaching care. Therefore, as college staff, it is suggested to improve the building environment, improve the teaching care, and establish good trust between teachers and students, which will help improve students' satisfaction. Student satisfaction is students' assessment of education, services, and facilities during their studies (Elliott & Shin, 2002). At the same time, seeing the significant influence relationship between the built environment and teaching care, through starting from the built environment, improve the teaching care, and then enhance students' satisfaction. Finally, through the research, it is found that satisfaction has a significant impact on loyalty. When students' satisfaction is improved, loyalty will also be improved accordingly.

5.3 Limitation and Further Study

The research on college students' satisfaction started early in developed countries such as the United States and Britain, and it has accumulated a deep theoretical foundation today. The investigation and practice activities of college students' satisfaction have formed a certain scale and a relatively complete index system. Based on China's current higher education environment, the research on college students' satisfaction and loyalty still need to mature. There are still many areas for improvement in the scale of investigation and the depth of theoretical research. The combination of theory and practice needs to be closer, and the construction of the student satisfaction model is more referential than innovative. Therefore, there is still a lot of research space and value in the research field of college students' satisfaction, which needs further exploration by researchers.

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