

# 대학교육수요자만족도지수(UCSI) 개발 및 적용

## Evolution and Application of University Customer Satisfaction Index

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### 요약

교육부의 대학구조개혁평가가 진행되는 시점에서 교육수요자만족도는 대학교육에 있어서 가장 중요한 요소이며 생존과 연계되어 있는 부분이지만, 대학교에서 운영하고 있는 교육수요자만족도 모델은 교육환경을 부분적으로 반영한 모델이 대부분이다. 본 연구의 목적은 대학 교육의 품질을 향상시키기 위해 대학에서 필요한 대학교육수요자만족도지수(UCSI)을 개발하고 실제로 적용하는 것이다. 본 연구는 개발된 UCSI의 도구의 타당도와 신뢰도를 검증하기 위해 2차 확인적 요인분석을 이용하였다. 그 결과 교육환경, 교육과정, 대학발전, 학생지원이라는 4대 요소와 18개 차원으로 구성된 UCSI를 개발하였으며, 확인적 요인분석을 통해 도구의 타당도와 신뢰도가 검증되었다. 본 연구에서 개발된 도구를 이용하여 대학 관계자들은 대학 교육수요자 만족도를 평가하고 IPA분석을 통해 전략을 세울 수 있게 되었다.

■ 중심어 : | 교육수요자만족도지수 | 대학교객만족도조사 | 대학구조개혁평가 | 학생만족도조사 |

### Abstract

Educational satisfaction is an important indicator of the educational field but the existing customer satisfaction index mainly focused on partial area because measurements could not reflect the alteration of university environment. The purpose of this research is to develop a new UCSI for university to improve the quality of university education. This research demonstrates validity and reliability of UCSI. This research uses the second-order confirmatory factor analysis. The results indicate that the reliability and validity of UCSI is verified. Education condition, education course, university development and student support are clarified to be appropriate components of the satisfaction survey. This research develops UCSI and applies it in a university. University managers can be used to measure the satisfaction level of university education and to improve the quality of university education.

■ keyword : | Customer Satisfaction Index | University Customer Satisfaction Index | University Performance |

## I. Introduction

With industrialization in the 1970s, University

education environment in Korea had a quantitative expansion, but it had insufficient quality and failed to meet the rapidly changing social demands. Recently,

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however, universities face a crisis internally and externally, because the number of students who are enrolled in school will be decreased, the difficulty of finding jobs due to low growth, and the freezing of tuition fees[1]. Additionally, universities try to survive in "Basic Plan for University Structure Reform Assessment" proposed by the Ministry of Education in order to improve the quality of university education since 2015[2].

The quality of university education has become a task that can no longer be delayed for the survival of the university. Universities have to make great efforts to meet the evaluation criteria presented in various evaluations such as university self-evaluation, university institution evaluation, and advanced education in undergraduate education[3].

Educational satisfaction is an evaluation criterion for the basic competency assessment of the university. It is an important indicator of the educational field-education performance sector and serves as a quality management mechanism that enables the university to improve the quality of education itself by self-checking. However, the existing university customer satisfaction index (UCSI) mainly focused on partial area because measurements could not reflect the alteration of university environment. Therefore, the new educational satisfaction measurements should be developed and its reliability and validity should be tested[1].

The purpose of this research is to develop a new UCSI for university to improve the quality of university education. This research demonstrates validity and reliability of UCSI. This research uses the second-order confirmatory factor analysis.

## II. Research Model

### 1. Literature review of UCSI

The satisfaction of education is defined as the subjective response of the students to the educational experience[4]. Satisfaction with the education is considered an important indicator of the overall predictability of the education services of the appropriate educational institutions[4-6]. Based on prior studies that measure university education satisfaction level, the level of satisfaction with university education is to be conceptualized by separating it into university education conditions and the curriculum in [Table 1].

Table 1. Factors of Satisfaction of University Education Satisfaction

Satisfaction classification	Factors of Satisfaction of University Education Satisfaction
Educational Condition	<ul style="list-style-type: none"> <li>•Facilities: Facilities such as library, computer lab, restaurant, and rest room</li> <li>•Student support: Scholarship, Overseas training</li> <li>•Employment support program operation</li> <li>•Administrative Services</li> <li>•Faculty</li> <li>•Interdisciplinary and Intercollegiate exchanges</li> </ul>
Curriculum	<ul style="list-style-type: none"> <li>•Major Curriculum</li> <li>•Lecture Content</li> <li>•Faculty's Ability</li> <li>•Lecture Method</li> </ul>

The previous studies of university satisfaction were focused on self-developed measurements[3][4][7] or modified SEVQUAL[5][9]. The studies on self-developed measurements conducted the validity and reliability of the measurement. Astin[4] developed the measurements included Professor, Curriculum and Instruction, School Life and School Facilities. Park[3] developed seven domains and 26 items, included curriculum, student guidance, student support, educational environment, administrative service, specialized programs, and college image. Kang[7] developed measurement with lecture, academic guidance, educational environment and self

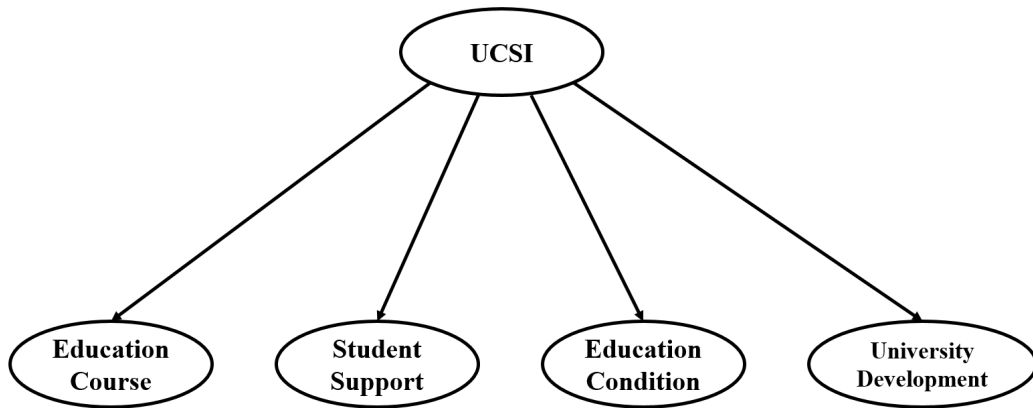


Fig. 1. Research model of UCSI

Table 2. The relation of UCSI with previous studies

Dimension	Components	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]
Education Course	Major Education	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Liberal Education	○	○	○	○		○		○	○	○	○	○	○	○	○	○	○
	Lecture Improvement	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○
Student Support	Learning Capability		○	○					○	○	○	○						
	Consult			○		○			○		○	○						
	Employment			○	○	○			○		○	○	○				○	○
Education Condition	Classroom Environment	○	○		○		○	○			○	○		○	○	○		○
	Library Environment	○			○	○	○	○			○	○		○	○	○		○
	Amenities	○			○	○	○	○			○	○	○	○	○	○		○
	Information Environment	○			○		○	○		○	○	○		○	○	○	○	○
	Administrative Service	○	○		○	○	○		○	○	○	○	○	○	○	○	○	○
	Notice	○			○							○			○	○	○	○
	Finance Transparency	○			○	○			○	○	○	○	○	○	○	○		○
University Development	Development Strategy		○							○	○		○		○	○		
	Community Collaboration												○	○			○	
	Global Capability								○								○	
	Communication								○								○	
	Image		○	○	○				○	○	○	○	○		○	○	○	○

Table 3. Measurements of UCSI

Dimension	Components	item	Dimension	Components	item		
Education Course	Major Education	A1	Speciality of professor	Education Condition	Information Environment	K1	Usability of homepage
		A2	Communication to students			K2	Convenient search of homepage
		A3	Fitness of goal and major education			K3	Usabilityofadministrationsystem
		A4	Help of major competency			K4	Easy of administration system
		A5	Possibility of multi major			K5	The latest computer facilities
	K6	Convenience of wireless network					
	Liberal Education	B1	Speciality of liberal professor		Administrative Service	L1	Administrative Service Accuracy
		B2	Communication to students			L2	Administrative service speed
		B3	Increase of basic learning ability			L3	Kindness of Staff
		B4	Suitable for talent and liberal arts			L4	Communication with students
		B5	Curriculum reflecting social demand			L5	Understanding students
	Lecture Improvement	C1	information of syllabus		Notice	M1	Convenience of notification
		C2	Sincere lectures			M2	Timely of notification
		C3	Fairness of grading			M3	Clarity of notification
		C4	Improvement of lecture evaluation			M4	Various routes of notification
M5	Ease of delivery of notification						
Student Support	Learning Capability	D1	Accuracy of information transmission	Finance Transparency	N1	Appropriateness of Tuition Fees	
		D2	Variety of programs		N2	Use tuition for students	
		D3	Practical help for learning		N3	Use tuition for univerisy development	
		D4	Kindness of learning counselor		N4	Transparent disclosure of usage	
		D5	Kindness of administrative staff				
	Consult	E1	Accuracy of information transmission	Development Strategy	O1	Awareness of college education goals	
		E2	Understanding the Student's Advisor		O2	Awareness of a university talent	
		E3	Counselor's expertise		O3	Awareness of University Vision	
		E4	Kindness of counselor		O4	Awareness of specialization	
		E5	Anytime consulting				
Employment	F1	Accuracy of information transmission	Community Collaboration	P1	Active public relations		
	F2	Variety of programs		P2	Positive external image		
	F3	Practical help for employment		P3	Positive social reputation		
	F4	Active for student employment		P4	Community Contribution Efforts		
	F5	Service availability		P5	Positive community reputation		
Education Condition	Classroom Environment	H1	Pleasant classroom	Global Capability	Q1	Variety of Foreign Language	
		H2	Equipment management		Q2	Help improve language skills	
		H3	Classroom facilities		Q3	Help from the English Caf	
		H4	Lecture Room		Q4	Diversity of study abroad	
	Q5	Easy to acquire information					
	Library Environment	I1	Appropriateness of facility	Communication	R1	Consultation among members	
		I2	Suitability of reading room		R2	Accept student opinions	
		I3	enough books		R3	Accept members opinions	
		I4	Rapid delivery of new books		R4	Compliance with democratic procedures	
		I5	Ease of search		R5	Disclosure of meeting log	
	Amenities	J1	Rationality of restaurant prices	Image	S1	Pride in our university	
		J2	Taste of the restaurant food		S2	Competitiveness	
		J3	Satisfaction of convenience facilities		S3	Vision / development potential	
		J4	Sufficient of student space		S4	University of Humanities	
		J5	Cleanliness of toilet		S5	University culture satisfaction	

management in academic life. Song[8] developed the measurements with 4 sub-areas and 12 factors. The 4 sub-areas are education method, education contents, education environment, and education outputs. Ruben[5] developed measurements with Quality of teaching, Quality of administrative service and Quality of teaching-learning. Lee[9] developed measurements with Tangibles, Reliability, Responsiveness, Assurance and Empathy. Lee et al.[10] developed measurements with curriculum content, professor activities, job search activity, public welfare, education environment and campus life using HedPERF. However, the limitation of the researches is to cover part dimensions of education services. It is necessary to develop a comprehensive measurement.

## 2. Research Model

Based on the CSI and relative literature, this research model is depicted in [Figure 1]. The relation of UCSI with previous studies are shown in [Table 2]. The UCSI is composed of four dimensions; education course, student support, education condition, university development. Education course dimension is measured by 14 items for three components(major education, liberal education and lecture improvement). Student support dimension is measured by 15 items for three components(employment, consult and learning capability). Education condition dimension is measured by 34 items for seven components(classroom environment, library environment, amenities, information environment, administration service, notice and finance transparency). University development dimension is measured by 24 items for five components(development strategy, community collaboration, global capability, communication and image).

## III. Research Method

This research developed multi-item measures based on a review of the literature. This research conducted field interviews with professors and students and then made modifications accordingly. Improved by literature review and field interviews, UCSI is composed of 4 dimensions, 18 components and 87 items in [Table 3]. The scale of this research is measured on a seven point Likert scale, ranging from strongly disagree (1) through neutral (4) to strongly agree (7).

To test the model, a web-based survey is employed in enrolled students. The survey yielded 358 usable responses. The samples was selected by stratified random sampling. The demographic statistics of major indicated that all major were equally selected by stratified random sampling method. The grades were freshman (27.7%), sophomore (25.1%), junior (19.6%), senior (27.7%). The sex were female (69.0%) and male(31.0%) in [Table 4].

Table 4. Demographic statistics

		year				total
		1	2	3	4	
sex	male	36 (10.1)	29 (8.1)	24 (6.7)	22 (6.1)	111 (31.0)
	female	63 (17.6)	61 (17.0)	46 (12.8)	77 (21.5)	247 (69.0)

## IV. Result

### 1. First-order Factor Analysis

The validity of the measurement model is evaluated by investigating convergent validity, reliability and discriminant validity. This research conducts the second-order confirmatory factor analysis(CFA) for UCSI. First, this research conducts first-order CFA for 4 dimensions, respectively.

The results of first order CFA for education course indicate that all factor loadings ranged from 0.76 to 0.90 except A5. Composite reliability (CR) and average variance extracted (AVE) in final model were over 0.78 and over 0.48 in [Table 5].

Table 5. Confirmatory factor analysis for education course

Path		Estimate	CR	AVE	
Major Education	→	A1	0.85	0.82	0.48
		A2	0.84		
		A3	0.83		
		A4	0.90		
		A5	0.53		
Liberal Education	→	B1	0.86	0.88	0.58
		B2	0.86		
		B3	0.90		
		B4	0.86		
		B5	0.85		
Lecture Improvement	→	C1	0.76	0.78	0.47
		C2	0.86		
		C3	0.80		
		C4	0.81		

The first order CFA for student support is conducted for three constructs, which included 15 items. The results indicate that all factor loadings ranged from 0.67 to 0.90. CR and AVE in final model were over 0.80 and over 0.45 in [Table 6].

Table 6. Confirmatory factor analysis for student support

Path		Estimate	CR	AVE	
Learning Capability	→	D1	0.81	0.82	0.47
		D2	0.90		
		D3	0.88		
		D4	0.72		
		D5	0.67		
Consult	→	EE1	0.74	0.80	0.45
		EE2	0.77		
		EE3	0.89		
		EE4	0.83		
		EE5	0.73		
Employment	→	F1	0.76	0.86	0.56
		F2	0.87		
		F3	0.90		
		F4	0.88		
		F5	0.88		

The first order CFA for education condition is conducted for seven constructs, which included 34 items. The results indicate that all factor loadings ranged from 0.63 to 0.93. CR and AVE in final model were over 0.63 and over 0.40 except Amenities in [Table 7]. Amenities have to be considered for application of UCSI by University.

Table 7. Confirmatory factor analysis for education condition

Path		Estimate	CR	AVE	
Classroom Environment	→	H1	0.84	0.73	0.41
		H2	0.83		
		H3	0.79		
		H4	0.79		
Library Environment	→	I1	0.88	0.83	0.49
		I2	0.93		
		I3	0.86		
		I4	0.75		
		I5	0.76		
Amenities	→	J1	0.73	0.63	0.26
		J2	0.74		
		J3	0.63		
		J4	0.72		
		J5	0.60		
Information Environment	→	K1	0.86	0.80	0.40
		K2	0.84		
		K3	0.87		
		K4	0.88		
		K5	0.73		
		K6	0.57		
Administrative Service	→	L1	0.85	0.87	0.58
		L2	0.85		
		L3	0.87		
		L4	0.91		
		L5	0.92		
Notice	→	M1	0.88	0.85	0.53
		M2	0.90		
		M3	0.88		
		M4	0.84		
		M5	0.75		
Finance Transparency	→	N1	0.74	0.78	0.48
		N2	0.92		
		N3	0.89		
		N4	0.79		

The first order CFA for university development is conducted for five constructs, which included 24 items. The results indicate that all factor loadings ranged from 0.78 to 0.94. CR and AVE in final model were over 0.83 and over 0.50 in [Table 8].

Table 8. Confirmatory factor analysis for university development

Path		Estimate	CR	AVE
Development Strategy	→	O1 0.84	0.83	0.55
		O2 0.88		
		O3 0.92		
		O4 0.83		
Community Collaboration	→	P1 0.80	0.84	0.52
		P2 0.89		
		P3 0.91		
		P4 0.81		
Global Capability	→	Q1 0.89	0.86	0.56
		Q2 0.87		
		Q3 0.85		
		Q4 0.84		
		Q5 0.92		
Communication	→	R1 0.92	0.90	0.65
		R2 0.93		
		R3 0.94		
		R4 0.92		
		R5 0.89		
Image	→	S1 0.88	0.83	0.50
		S2 0.85		
		S3 0.86		
		S4 0.91		
		S5 0.78		

2. Second-order Factor Analysis

The second order CFA for UCSI is conducted for four constructs, which included 18 items. The results indicate that all factor loadings ranged from 0.66 to 0.92. CR and AVE in final model were over 0.81 and over 0.42 in [Table 9].

Table 9. Confirmatory factor analysis for university customer satisfaction index

Path		Estimate	CR	AVE
UCSI	→	Education Course 0.86	0.92	0.73
		Student Support 0.87		
		Education Condition 0.92		
		University Development 0.83		
Education Course	→	Major Education 0.80	0.81	0.59
		Liberal Education 0.79		
		Lecture Improvement 0.89		
Student Support	→	Learning Capability 0.90	0.84	0.64
		Consult 0.82		
		Employment 0.84		
Education Condition	→	Classroom Environment 0.78	0.83	0.42

		Library Environment 0.76	0.83	0.50
		Amenities 0.78		
		Information Environment 0.86		
		Administrative Service 0.69		
		Notice 0.78		
		Finance Transparency 0.66		
University Development	→	Development Strategy 0.79	0.83	0.50
		Community Collaboration 0.90		
		Global Capability 0.76		
		Communication 0.83		
		Image 0.86		

3. Development of UCSI

This research develops UCSI for evaluating students satisfaction of university, based on formula as follow:

$$UCSI = \frac{\sum_{i=1}^n (D_i W_i)}{n} \tag{1}$$

where  $D_i$  denotes dimension  $i$ ,  $W_i$  is weight  $i$  for dimension  $i$ . Weight is calculated with correlation efficient between dimension and overall satisfaction.

$$D = \frac{\sum_{j=1}^n (C_j)}{n} \tag{2}$$

where  $C_j$  denotes component  $j$  composed on own dimension,

$$C = \frac{\sum_{k=1}^n (I_k)}{n} \tag{3}$$

where  $I_k$  denotes item  $k$  composed on own component,

Based on the above formula, this research develops UCSI and adapts it to a university. First, the data are changed from 7 scale to 100 point and education course dimension is calculated in [Table 10].

Table 10. The results of education course dimension

no	A1	A2	A3	A4	A5	C	W
Raw data	7	7	6	6	7		0.05
f(2,3)	100	100	83,3	83,3	100	93,3	4,3

Second, UCSI for  $i$ -th student is shown in [Table 11].

Table 11. The results of UCSI

no	D1	D2	D3	...	D16	D17	D18	UCSI <sub>i</sub>
$i$	4,3	4,0	4,2	...	4,0	3,6	3,5	59,3

Finally, the first priority dimensions are evaluated by Importance-Performance Analysis(IPA) in [Figure 2].

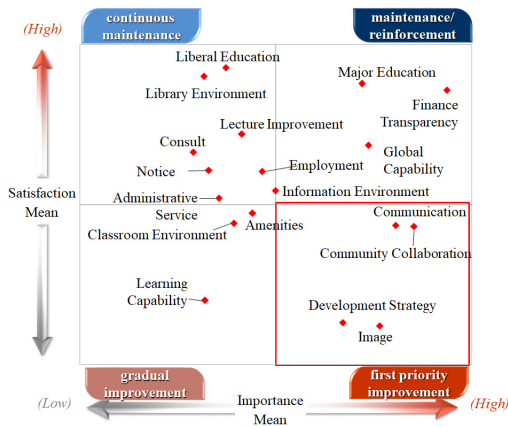


Fig. 2. The results of IPA

## V. Conclusions

The purpose of this research is to develop a new UCSI for university to improve the quality of university education. The second-order confirmatory factor analysis is conducted to test the validity and the reliability of UCSI.

The results of this research indicate that the validity and reliability of the UCSI is verified. Firstly, the validity of the measurement model was evaluated by investigating convergent validity[24]. Items should load at least 0.60 on their respective hypothesized component. The results indicated that all factor

loading for each item was significant.

Reliability should be evaluated jointly by investigating composite reliability (CR) and the average variance extracted (AVE). CR should be at least 0.60 and the AVE should be at least 0.5. The results indicated that CR and AVE of all dimensions was significant except some items.

Conclusively, education condition, education course, university development and student support are clarified to be appropriate components of the satisfaction survey.

The results of this research have several contributions. To compete successfully in today's education environment in Korea, customer satisfaction of university is an important indicator. In academia, this research proposes a comprehensive and new UCSI to compete successfully in today's education environment in Korea. Second, university managers can be used to measure the satisfaction level of university education and to improve the quality of university education.

It has also several limitations. This research was conducted only on an university. Other universities might have to be very careful to be adapted our methods. Second, the items of this research are only a part of many variables that might affect the students satisfaction. More dimensions and constructs are necessary to analysis.

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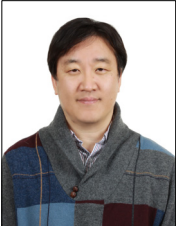
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