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Higher Education Quality Indicators: A Scale Development Study[1]

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ABSTRACT

The purpose of this research is to develop a Likert-type scale aimed at determining how quality indicators in higher education are perceived by faculty members. A pilot study of the research was conducted with the participation of 390 faculty members. As a result of the factor analysis applied to test the construct validity of the 67-item draft scale, a measurement tool consisting of 9 dimensions and 49 items was developed. The first dimension is named Education and Instruction, the second is Structure of the University, the third is Socio-Cultural Opportunities, the fourth is Internationalization, the fifth is Economic Opportunities, the sixth is Student Requirements, the seventh is Accreditation, the eighth is Preferability, and the ninth is Technological Competence. The overall Cronbach's Alpha reliability coefficient of the scale has been calculated as 0.96. Additionally, as a result of the independent groups t-test for the reliability of the scale, it has been determined that items and factors are distinctive between the lower and upper 27% groups; the item-total and item-remainder correlation values are significant. Correlation coefficients between factors and the test-retest correlation coefficient for the entire scale have been found significant. Based on the conducted analyses, the validity and reliability of the scale have been established. The scale has been named the Higher Education Quality Indicators: Faculty Member Scale (HEQIFMS).

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INTRODUCTION

Quality

The immense shifts and advancements in the domains of globalization, science, technology, and communication, along with the transformations in the political, economic, social, and cultural structures of nations, combined with market expectations and the escalating demand for lifelong education, have influenced all institutions. These changes have compelled them into a competitive environment on both national and international scales, necessitating the enhancement of the quality of their products and services (Karaca, 2008). Furthermore, factors propelling the prominence of the quality concept include the dynamic nature of customer expectations and needs, the rise of global liberalization movements, technological evolutions, and the escalating intensity of global competition (Ağın, 2020). Quality is often utilized as a metric of excellence (Madu and Madu, 2002). The concept of quality possesses a relative definition; its content and the means by which it is measured vary based on the definer (De Weert, 1990; Liu, 2016; Tam, 2001).

Quality is characterized as the extent to which the expectations of those benefiting from a product or service are met, their perceived satisfaction, and the realization of what is desired (Büyükşahin and Şahin, 2017). In Balcı's (1998) study, quality was defined as acting in accordance with the highest criteria, while also highlighting that the relative definition of quality encompasses two dimensions: measurement and transformation. In the scholarly exploration conducted by Garvin, he delineated eight critical dimensions of quality, though these were not subjected to empirical validation. The enumerated dimensions encompass performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality, as subsequently referenced by Brucks, Zeithaml, and Naylor (2000), Karakaya, Kılıç, and Uçar (2016), and Syarhrial et al. (2018). The first dimension, performance, pertains to the effortless and seamless usage of a product's features by customers. Features are the primary components of a product and, for certain products, represent the most vital dimension due to their role in enhancing quality, offering personalization based on customer expectations. Conformance refers to the extent to which a particular product aligns with the predetermined design specifications. When products or processes satisfy the designated criteria, they are considered to have achieved the stipulated specifications. A product's attributes satisfying customer requirements demonstrate that the product conforms to the stated standard. Aesthetics refers to the properties sensed by the customer's five sensory organs during the product's appearance and usage. Perceived quality demonstrates the efficacy of product visuals, advertising, or brand names on customers. These dimensions emphasize that quality can be defined not just with objective criteria but also through subjective evaluations.

Quality in Education

Historically, education has been one of the primary mechanisms for societal advancement, individual self-actualization, and the transmission of knowledge from one generation to the next. However, it's not only the presence of education but also its quality that plays a critical role in this process. The concept of quality in education emerges as a challenging and value-laden term due to its conceptual intricacy (Aksoy, 2001). For researchers, quality in education is multidimensional, influenced by historical context, and signifies the endeavor to achieve better and perfect outcomes in educational activities. When revisiting the relativity of the quality concept, a subjectivity appears both in its ideological interpretation and the definition of educational components. Indicators defining educational quality vary across societies and ideologies, leading to differing interpretations (Aksoy, Kayahan Karakul, Aras, & Çankaya, 2011).

Quality education aims to respond to the needs, ideals, and conditions of the contemporary society (Tan, 1989). Educational quality is the level at which the explicit and implicit expectations of internal and external stakeholders are met. The concept is multifaceted and cannot be evaluated by a single metric. It's often challenging for an educational institution to meet all stakeholder expectations

simultaneously. Thus, educational quality might be perceived as low by some aspects and high by others (Cheng & Tam, 1997). Quality can be defined as the ability of educated individuals to meet societal needs and demands through their acquired knowledge, skills, and behavioral competencies (Kayadibi, 2001). Although quality in education might initially appear quantifiable through metrics such as test scores, graduation rates, or employability, this is just the tip of the iceberg. Quality education entails a holistic approach that encompasses not merely academic accomplishments, but also addresses emotional, social, and ethical growth (Kayadibi, 2001; Gökkaya, 2016). In addition to the dissemination of knowledge and competencies, the cultivation of critical thinking, problem-solving capacities, empathy, and the propensity for lifelong learning are integral components of exemplary educational practices (Kölemen & Erişen, 2017). Quality in education, when considered as a criterion for change, signifies systematic impacts on the student. The magnitude of quality indicates the positive changes an educational institution or program can impart. Through its contributions to an individual's knowledge, values, attitudes, and behaviors, education enhances potential, applicable not only to individuals but also to societal groups and institutions. High-quality education aims to maximize student development and transformation. This evaluation's continuity necessitates consistent data collection from students (Cemaloğlu, 1998).

Quality in Higher Education

Amid the multifaceted social, political, and economic evolutions of the 21st century, both on a global scale and specifically within Turkey, there has been an intensified demand for advanced educational opportunities. In response to this burgeoning need and with the objective of augmenting accessibility to higher education across all age demographics, Turkish national educational policies have facilitated the proliferation of higher education institutions and bolstered their operational capacities. A salient feature of this strategic expansion has been the endeavor to establish a university in each province (Özdemir et al., 2013; Çetinsaya, 2014; Aytar et al., 2018). Increasing capacities in higher education has brought challenges in the delivery, comprehension, and management of academic, social, economic, and daily life support services for students (Audin et al., 2003). These developments in the higher education system have intensified both national and international competition, driving institutions towards a quest for quality.

Özer and colleagues (2010) note that, due to the complexity of education and specifically higher education, there's no consensus on what quality is in both areas or how it can be measured. Securing a universally accepted conceptualization of quality in higher education has proven elusive. Contemporary endeavors to encapsulate the essence of quality within this domain have encountered obstacles, primarily attributable to the heterogeneity in educational systems across nations and the dynamic shifts in individual and societal requisites (Hamalainen, 2003). The inherent multifaceted and context-dependent characteristics of quality within higher education yield divergent interpretations among its stakeholders, inclusive of service providers, beneficiaries such as students, end-users like employers, and the academic personnel (Dicker et al., 2019). When evaluating quality by service quality, criteria like the socio-cultural facilities (food services, sports activities, etc.) offered by the higher education organization, medical-social services, library facilities, housing, and the satisfaction of beneficiaries emerge as determining factors (Çimen, 2012). Quality manifestation is tied to specific standards. The degree to which these standards are met indicates the level of quality. Quality in higher education relates to how effectively an institution can achieve its mission and goals. It is also an ongoing effort to improve within the framework of institutional autonomy (Özer, Gür, & Küçükcan, 2010).

For a higher education institution and its stakeholders to provide a quality education environment, some fundamental attributes they should possess have been outlined by Kanwar and Trumbić (2015). It is posited that the onus of securing and actualizing quality within the realm of higher education predominantly rests upon the shoulders of the educational providers and their faculty. The triad of paramount missions for higher education institutions comprises education, research, and community

outreach. Essential to the preservation and enhancement of educational excellence are rigorous quality assurance protocols, encompassing both internal and external assessments. It is also essential to make clear distinctions between quality assurance, quality improvement, and quality enhancement. Quality assurance is an ongoing process of developing, implementing, and refining criteria and procedures to monitor and enhance educational quality, while quality improvement and enhancement signify targeted, purposeful actions to elevate standards (Özer et al., 2010). The current study aimed to develop A Scale for Quality Issues in Higher Education in Turkey: Views of Faculty Members in State Universities on Quality.

METHOD

In this section, the design of the study, the sample, the scale development stages, and statistical analysis information are presented.

Research Design

The current study aimed to develop A Scale for Quality Issues in Higher Education in Turkey: Views of Faculty Members in State Universities on Quality.

Study Group

For factor analysis, a minimum of 300 is recommended (Çokluk, Şekercioğlu, & Büyüköztürk, 2012), and a number of 5 to 10 times is suggested (MacCalum, Widaman, Zhang, & Hong, 1999). When determining the sample, five times the number of items in the draft scale was considered (67x5 = 325), and it was decided that a sample size consisting of 390 faculty members would be sufficient for the scale development study. Table 1 provides demographic information related to the participating faculty members.

Table 1. *Characteristics of the faculty members participating in the pilot study of the research*

Characteristics		*n*	*%*
Gender	Female	197	50.51
	Male	193	49.49
Academic Title	Professor	58	14.88
	Associate Professor	113	28.97
	Assistant Professor	41	10.51
	Lecturer	19	4.87
	Research Assistant	102	26.15
	Other	57	14.62
Age Group	20 – 30 Years	69	17.69
	31 - 40 Years	186	47.69
	41 – 50 Years	67	17.17
	51 – 60 Years	55	14.10
	61 Years and above	13	3.35
Education Level	Bachelor's	7	1.79
	Master's	78	20.00
	Doctorate	304	77.94
	Not Specified	1	0.27
Field of Study	Natural Sciences	110	28.20
	Social Sciences	134	34.35
	Health Sciences	49	12.56
	Educational Sciences	97	24.89
Tenure	1 – 5 Years	84	21.53
	6 – 10 Years	107	27.43
	11 – 15 Years	47	12.05
	16 – 20 Years	50	12.82
	21 – 25 Years	41	10.51
	26 Years and above	61	15.66
Foundation Year of the University Where the Faculty Members Work	Established Before 1982	190	48.61
	Established Between 1982 – 2000	92	23.83
	Established After 2000	108	27.57

Administrative Duty	Yes	105	26.92
	No	283	72.56
	Not Specified	2	0.52
Faculty/Unit Where the Faculty Members Work	Faculty of Education	109	27.94
	Faculty of Arts and Sciences	70	17.94
	Faculty of Engineering and Architecture	49	12.56
	Faculty of Economics and Administrative Sciences	20	5.12
	Faculty/College of Health Sciences	17	4.35
	Faculty of Medicine	12	3.07
	Faculty of Communication	8	2.05
	Faculty of Law	9	2.30
	Faculty of Fine Arts	19	4.87
	School of Physical Education and Sports	3	0.76
	Faculty of Agriculture	8	2.05
	Vocational College	12	3.07
	Faculty of Dentistry	12	3.07
	Faculty of Theology	9	2.30
	College	14	3.58
	Other	19	4.87

As seen in Table 1, 50.5% (197) of the participating faculty members are female, and 49.5% (193) are male. Of the faculty members, 14.6% (58) are professors, 14.9% (57) are associate professors, 26.2% (102) are research assistants, 4.9% (19) are lecturers, 10.5% (41) are assistant professors, and 29.0% (113) hold other academic titles. In terms of age, 17.7% (69) of the participants are between 20 – 30 years, 47.7% (186) are between 31 – 40 years, 17.2% (67) are between 41 – 50 years, 14.1% (55) are between 51 – 60 years, and 3.1% (12) are aged 60 and above. Regarding their tenure, 21.5% (84) have 1 – 5 years, 27.4% (107) have 6 – 10 years, 12.1% (47) have 11 – 15 years, 12.8% (50) have 16 – 20 years, 10.5% (41) have between 21 and 25 years, and 15.6% (61) have more than 26 years of experience. In relation to their educational qualifications, 1.8% (7) hold bachelor's degrees, 20.0% (78) hold master's degrees, and 77.9% (304) have doctoral degrees. 0.3% (1) of participants did not specify their education level. In terms of their academic disciplines, 28.2% (110) are from natural sciences, 34.4% (134) are from social sciences, 12.6% (49) are from health sciences, and 24.9% (97) are from educational sciences. For institutional affiliation, 48.61% (190) are from universities established before 1982, 23.83% (92) are from those established between 1982 – 2000, and 27.57% (108) are from those established after 2000. Additionally, 27.9% (109) serve in faculties of education, 17.9% (70) in faculties of arts and sciences, 12.6% (49) in faculties of engineering and architecture, 5.1% (20) in faculties of economics and administrative sciences, 4.4% (17) in faculties or colleges of health sciences, 3.1% (12) in faculties of medicine, 2.1% (8) in faculties of communication, 2.3% (9) in faculties of law, 4.9% (19) in faculties of fine arts, 0.8% (3) in schools of physical education and sports, 2.1% (8) in faculties of agriculture, 3.1% (12) in vocational colleges, 3.1% (12) in faculties of dentistry, 2.3% (9) in faculties of theology, 3.6% (14) in colleges, and 4.9% (19) in other units. Regarding administrative duties, 26.9% (105) of participants have administrative roles, 72.6% (283) do not, and 0.3% (1) did not provide information on this aspect.

Stages of Scale Development

To ensure the validity of the scale, the literature regarding indicators of higher education quality was reviewed. These quality indicators were identified, theoretical studies were examined, and relevant scales concerning the topic were analyzed. An item pool was created. Expert opinions were sought to evaluate the items. Descriptive analysis, Exploratory Factor Analysis (EFA), and correlations between the scale's total score and the factors were carried out. During the development process of the 'Higher Education Quality Indicators Faculty Scale', the initial step was to ascertain how faculty members define and perceive the quality indicators that a qualified higher education institution should possess. Literature encompassing quality studies in higher education and related research was reviewed to define

and determine higher education quality indicators.

Theoretical information and related scales were studied, leading to the creation of a draft measuring tool consisting of 74 items. To evaluate the draft scale in terms of its format, content, comprehensibility, and grammar, it was shared with 3 professors, 3 associate professors, 2 assistant professors, 4 PhD holders, and 2 PhD students. Experts were provided with a form and asked to mark one of the options: "appropriate," "needs modification," or "inappropriate" for each item. After incorporating the experts' feedback, 7 items were removed, reducing the item count to 67. All items on the draft scale, prepared in a five-point Likert type, were positively scored. The scale consists of 67 items and 9 sub-dimensions. Scores on the scale range from a minimum of 67 to a maximum of 325, with higher scores indicating higher quality in higher education institutions.

Data Analysis

To present statistical evidence regarding the validity of the scale, both EFA and Confirmatory Factor Analysis (CFA) were conducted. Suitability for EFA was determined first by the Kaiser-Meyer-Olkin (KMO) measure, followed by the Bartlett's test. EFA was performed using principal component analysis and the Varimax orthogonal rotation method. Correlation coefficients between the scale's total score and the total scores of the factors were calculated to ascertain the relationship between the scale and its items. During CFA, the chi-square value and fit indices were scrutinized. For the CFA model to be valid, fit indices need to be at acceptable levels. To test the reliability of the developed scale, the Cronbach's Alpha value was calculated. To provide evidence of the relationship between the scale as a whole and its items, necessary correlation coefficients were determined. The distinctiveness of the items was determined using paired groups t-test analyses. Data analysis was conducted using statistical package programs (SPSS and AMOS).

FINDINGS

In this study, a valid and reliable 'Higher Education Quality Indicator: Faculty Scale', aimed at measuring faculty perceptions regarding the quality of higher education institutions, has been developed.

Findings Related to Validity Studies

To determine whether the data set demonstrates a normal distribution, the Kolmogorov-Smirnov significance value (p), skewness and kurtosis coefficients were examined. For the data to be normally distributed, it is recommended that the Kolmogorov-Smirnov value be greater than 0.05 (p>0.05) or skewness and kurtosis values fall between -1 and +1 (Çokluk, Şekercioğlu, and Büyüköztürk, 2012). For analyzing the data obtained from the scale, scores need to show a normal distribution (Özdamar, 2016). Descriptive values related to the data obtained by applying the draft scale to faculty members working in state universities are presented in Table 2.

Table 2. *Descriptive statistical values for the higher education quality ındicators academic staff scale*

	Values
Frequency	390
Mean	3.08
Standard Deviation	0.62
Minimum Score	1.15
Maximum Score	5.00
Range	3.85
Skewness	-0.14
Kurtosis	0.24
Median	3.07
Kolmogorov Smirnov	0.04
P	0.19
Shapiro-Wilk	0.99

P value	0.50

As seen in Table 2, the values for Kolmogorov-Smirnov (0.04 and p>0.05) and Shapiro-Wilk (0.99 and p>0.05) tests are not significant, and since the kurtosis (0.24) and skewness (-0.14) values are within the ±1 range, the scores are normally distributed (Bayram, 2013; Büyüköztürk, 2012; Çokluk et al., 2012).

To ascertain the construct validity of the instrument, a sequential approach employing both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) was adopted. Preceding the execution of EFA, the Kaiser-Meyer-Olkin (KMO) measure, as stated by Kalaycı (2005), was employed to evaluate the appropriateness of the data set, particularly with respect to sample adequacy, and to juxtapose the magnitudes between observed correlation coefficients and their partial counterparts. Additionally, the Bartlett's test of Sphericity was conducted to determine whether the measurement tool can be factorized. The results for the Kaiser-Meyer-Olkin and Bartlett's test are given in Table 3.

Table 3. *Results of the Kaiser-Meyer-Olkin and Bartlett's test for the higher education quality ındicators academic staff scale*

Kaiser-Meyer-Olkin (KMO)		0.953
Barlett(s	χ^2	17020.493
	sd	2211
	p value	0.000

Upon reviewing Table 3, it can be observed that the draft scale's KMO value is 0.953. According to Çokluk and colleagues (2012), a value between 0.50-0.60 is considered "poor"; between 0.60-0.70 is "weak"; between 0.70-0.80 is "moderate"; between 0.80-0.90 is "good", and a value of 0.90 and above is "excellent". When reviewing the results of the Bartlett's Test, the chi-square (χ^2) value is significant at the 0.01 level, suggesting the data structure is suitable for factor analysis (Tabachnick and Fidell, 2017). Additionally, Bartlett's Test helps determine whether the data comes from a normal distribution and is multivariate. A significant result from Bartlett's Test implies the data is multivariate and normally distributed (Otrar and Argın, 2015). Due to the fulfillment of both the Kaiser-Meyer-Olkin and Bartlett's Test criteria, evaluations for the exploratory factor analysis continued.

The eigenvalues and variance explained by the factors were determined through principal components analysis. To determine the most appropriate item distribution, the explained total variance value, and the factors, cutoff points of .32, .33, .40, .45, and .50 were used in the analysis. When evaluating item distributions, the explained total variance value, and the resulting factors for academic staff, the most suitable result was obtained at the .40 level. The eigenvalues and the variance explained by the factors resulting from the analysis of data collected from academic staff are shown in Table 4.

Table 4. *Eigenvalues and explained variance from the ınitial analysis of the higher education quality ındicators academic staff scale.*

Factor	Eigenvalue	Variance	Cumulative Total
1	24.762	36.959	36.959
2	3.231	4.822	41.781
3	2.232	3.331	45.112
4	2.000	2.984	48.096
5	1.709	2.550	50.646
6	1.598	2.385	53.031
7	1.524	2.275	55.306
8	1.383	2.064	57.369

9	1.259	1.879	59.249
10	1.138	1.698	60.947
11	1.066	1.590	62.537
12	1.033	1.542	64.079

The total sum of squares of factor loadings related to items for a factor is termed as the eigenvalue of that factor (Shrestha, 2021). Upon examining Table 4, it can be observed that there are twelve components with eigenvalues greater than 1. The total contribution of these twelve components to the variance is 64.079%. One of the most crucial points to evaluate when deciding on the number of factors is the contribution each factor makes to the variance (Çokluk et al., 2012).

In the subsequent step, items below .40 were removed. Later, the factor loading values and multicollinearity of the items were evaluated to determine if they met the acceptable threshold. For an item to be considered multicollinear, the analyzed item must display high values in more than one factor above the acceptance level (.40) and the difference between the loading values they exhibit with different factors must be less than .1 (Çokluk et al., 2012; Büyüköztürk, 2012). Items exhibiting a discrepancy in factor loadings of less than 0.1 were sequentially eliminated, commencing with the item of the most minimal loading value, with the analysis being reiterated after each exclusion. After this iterative refinement, a total of 18 items were excised from the preliminary scale draft. To crystallize the structure of the emergent scale draft and ascertain its factor constitution, the proportion of variance elucidated was scrutinized. It was subsequently discerned that the extant 49 items were apportioned amongst 9 distinct factors. Table 5 provides the explained total variance of the higher education quality indicators faculty scale.

Table 5. *Explained total variance of the higher education quality indicators faculty scale*

Factor	Eigenvalue	Variance	Cumulative Total
1	18.28	37.32	37.32
2	2.75	5.62	42.95
3	1.86	3.80	46.75
4	1.84	3.76	50.51
5	1.48	3.04	53.55
6	1.40	2.85	56.41
7	1.36	2.79	59.20
8	1.15	2.34	61.54
9	1.07	2.18	63.73

The sum of the squares of the factor loadings of items associated with a factor is termed as the eigenvalue for that factor (Shrestha, 2017). Upon examining Table 5, it can be discerned that there are twelve components with an initial eigenvalue exceeding 1. The contribution of these twelve components to the total variance is 64.079%. However, when deciding on the number of factors, it is crucial to assess the contribution of each factor to the variance (Çokluk et al., 2012).

Reviewing Table 4, it is evident that the explained total variance has decreased compared to the initial value. Nonetheless, it was determined that items are grouped under structures as theoretically defined. Consequently, it was decided that the scale consists of 9 factors. Accordingly, 63.731% of the total variance is explained by these 9 factors; the first factor accounts for 37.322% of the variance, the second factor 5.629%, the third factor 3.802%, the fourth factor 3.761%, the fifth factor 3.040%, the sixth factor 2.857%, the seventh factor 2.792%, the eighth factor 2.346%, and the ninth factor explains 2.183% of the variance.

Following the Varimax rotation procedure, the distribution of the items across the factors was determined, and the factors were named as displayed in Table 21. The first factor is named “education-teaching”, the second “university structure”, the third “socio-cultural opportunities”, the fourth

"internationalization", the fifth "economic opportunities", the sixth "student needs", the seventh "accreditation", the eighth "preferability", and the ninth factor is termed "technological proficiency". The scale has been titled "Higher Education Quality Indicators: Academic Staff Scale".

Table 6. *Higher education quality ındicators academic staff scale - ıtems remaining after exploratory factor analysis*

		1	2	3	4	5	6	7	8	9
S2	The implemented program instills critical thinking skills.	.81								
S3	It fosters abstract thinking and reasoning abilities.	.75								
S4	The education curriculum aligns with societal changes and demands.	.73								
S1	The educational curriculum remains current.	.71								
S7	Intended learning outcomes are achieved.	.69								
S22	It imparts students with professional skills that meet market expectations.	.65								
S25	A process-oriented assessment approach is adopted.	.62								
S24	Student performance is evaluated in line with assessment principles.	.60								
S19	The university provides active learning environments.	.59								
S8	There is a continuous pursuit for quality enhancement.	.58								
S26	It offers ample opportunities for students' individual development.	.58								
S20	Mechanisms to evaluate the success of teaching programs are in place.	.54								
S5	The university encompasses multiple national and international cultures, exemplifying cultural diversity.	.52								
S18	Sufficient opportunities for professional development are presented to students.	.51								
S30	Students are encouraged to undertake scientific research.	.50								
S6	Course options aligning with students' interests are available.	.49								
S66	All stakeholders participate in quality improvement processes.		.80							
S67	Quality is embraced by the university management.		.74							
S64	Administrative rules and norms are transparent.		.74							
S65	Platforms for self-expression are provided.		.72							
S21	University constituents actively partake in decision-making processes.		.59							
S62	Quality is embodied as a culture within the university.		.56							
S61	Quality is explicitly stated in the university's strategic plan.		.52							
S32	Adequate resources are allocated for scientific research and studies.		.44							
S44	Suitable facilities and tools for sports activities are provided.			.85						
S41	The university possesses the necessary infrastructure for sports and cultural events.			.82						
S45	It holds significant recognition in sports and cultural activities.			.70						
S50	Opportunities for recreational and cultural activities are available.			.58						
S36	The accommodation services meet the expectations and needs of students.			.51						

S39	A secure learning environment is provided.	.45						
S13	Opportunities to participate in international exchange programs are offered.		.73					
S14	Collaborations with overseas universities are established.		.70					
S12	Comprehensive facilities for international student admissions are available.		.67					
S16	Education in foreign languages is provided.		.58					
S49	Opportunities for professional experiences and internships are presented to students.			.70				
S48	Job opportunities within the institution are provided for students in need.			.67				
S47	Scholarship opportunities that cater to students' requirements are available.			.58				
S52	The satisfaction levels of students are assessed.				.77			
S53	Efforts are made to determine student needs.				.65			
S57	Students are given the right to provide feedback concerning their education.				.56			
S55	It is certified by the Turkish Standards Institute (ISO 9001, ISO 22000, ISO 18001, ISO 15224, ISO 29990, ISO 31000).					.79		
S54	Possesses an accredited quality management system.					.77		
S43	Teaching programs are accredited by authoritative institutions.					.48		
S58	Holds a top position in student preferences.						.80	
S59	Graduates easily secure employment.						.64	
S60	Given the chance, I would prefer to transfer to another university.						.58	
S10	Adequate print and electronic resources are available for accessing information.							.76
S34	Access to international databases (EBSCOhost, Springer, ProQuest, etc.) is offered.							.65
S9	Teaching staff possess competent skills in technology utilization.							.49

Upon examining Table 6, it is observed that after the final analysis, 49 items remain in the measurement tool. All items of the scale meet the acceptance level of .40, and the varimax rotation analysis indicates no compound items at the .01 level. Factor loadings for the scale are as follows: the first factor ranges between .81 and .489; the second factor between .80 and .44; the third factor between .85 and .45; the fourth factor between .73 and .58; the fifth factor between .70 and .58; the sixth factor between .74 and .539; the seventh factor between .79 and .48; the eighth factor between .80 and .58; and the ninth factor between .76 and .49. Items demonstrating strong inter-relations have converged to form these factors.

To validate the structure revealed by Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) was conducted. Confirmatory factor analysis operates as a form of hypothesis testing. It is grounded in the testing of theories associated with latent variables and is utilized in advanced research to confirm or refute a theoretically-developed model or to determine the extent to which an anticipated model aligns with the observed model (Tabachnick & Fidell, 2001; Şencan, 2005). According to Sümer (2000), confirmatory factor analysis provides detailed statistics concerning the degree of congruence between data obtained from a model that describes relationships among latent variables. In other words, through CFA, researchers seek to confirm the validity of the proposed structure.

In evaluating model fit within Confirmatory Factor Analysis, chi-square statistical values and goodness-of-fit indices are the two most popular methods (Hu & Bentler, 1999). In the Confirmatory Factor Analysis, the appropriateness of the scale structure was assessed based on chi-square and goodness-of-fit indices. Figure 1 presents the confirmatory factor analysis for the developed faculty member scale.

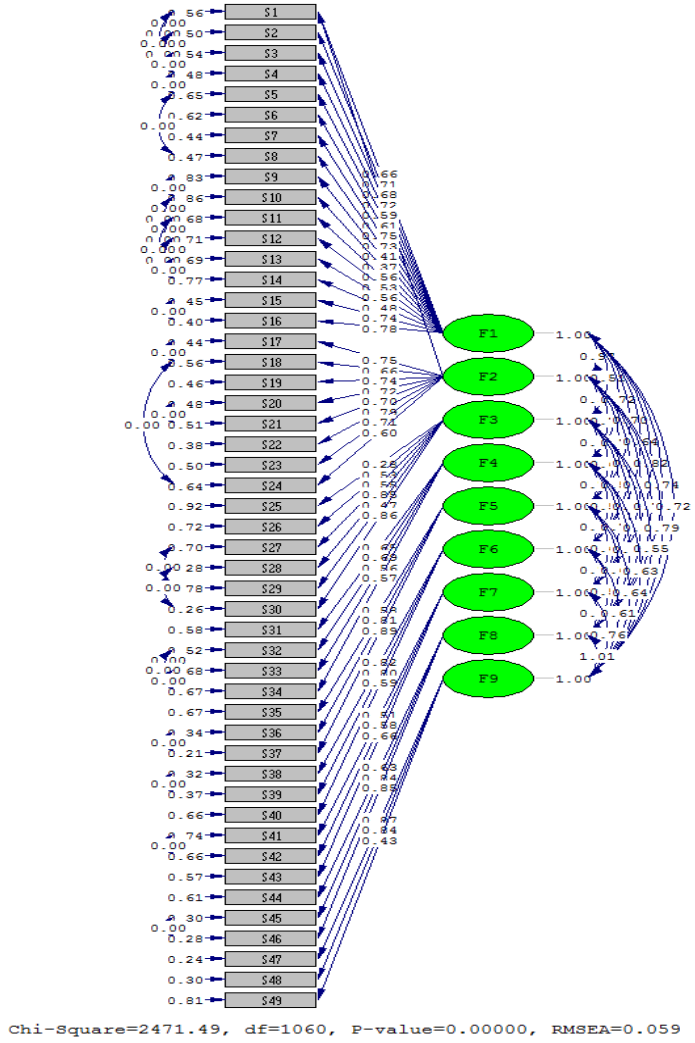

Figure 1. *Faculty member scale confirmatory factor analysis*

In Figure 1, for the decision on whether the model was validated based on the Confirmatory Factor Analysis, the p-value was first examined, followed sequentially by χ^2/df and fit indices. Although a significance level of p-value not being significant at .01 was expected in the Confirmatory Factor Analysis, it turned out to be significant due to the large sample size.

Table 7. *Conformity index values obtained from the conducted DFA analysis*

Fit Indices	Excellent Fit Criteria	Acceptable Fit Criteria	Fit Index Values Obtained from Scale
[1]χ^2/df	$0 \leq \chi^2/df \leq 2$	$2 \leq \chi^2/sd \leq 3$	2.33
[2]RMSEA	.00 ≤ RMSEA ≤ .05	.05 ≤ RMSEA ≤ .08	.059
[2]SRMR	.00 ≤ SRMR ≤ .05	.05 ≤ SRMR ≤ .10	.059
[3]GFI	.95 ≤ GFI ≤ 1.00	.90 ≤ GFI ≤ 95	.79
[4]AGFI	.90 ≤ AGFI ≤ 1.00	.85 ≤ AGFI ≤ .90	.76
[2]NNFI (TLI)	.95 ≤ NNFI (TLI) ≤ 1.00	.90 ≤ NNFI (TLI) ≤ .95	.97
[2]CFI	.95 ≤ CFI ≤ 1.00	.90 ≤ CFI ≤ .95	.98

Source: [1]Kline, 2011, [2]Browne & Cudeck, 1993, [3]Baumgartner & Homburg, 1996; Bentler, 1980; Bentler & Bonett, 1980; Marsh, Hau, Artelt, Baumert & Peschar, 2006, [4]Schermelleh-Engel & Moosbrugger, 2003

When Table 7 is examined, the chi-square value (χ^2= 2471.49; p= .00) relative to its degrees of freedom (df= 1060) gave a ratio (χ^2/df= 2.33) indicating excellent fit; the RMSEA fit value (.059)

showed good fit, as did the RMR value (.064) and Standardized RMR (.059). The GFI fit value (.79) and AGFI fit value (.76) showed poor fit, whereas the NNFI fit value (.97) and the CFI fit value (.98) indicated excellent fit.

During the Confirmatory Factor Analysis (CFA) process, we implemented a series of modifications to enhance the fit of our model. Taking into consideration the modification indices and theoretical rationalization, we reevaluated the factor loadings and covariances of specific item pairs. In this context, the covariances between s1-s4, s2-s4, and s3-s4 were examined, strengthening the relationships among these items. Similarly, the relationships between item pairs s4-s5, s5-s8, and s9-s10 were restructured. Furthermore, item pairs beginning with s11-s14, s12-s14, and s13-s14 were reviewed to achieve more consistent and theoretically meaningful outcomes. The relationships between s15-s16, s17-s18, s18-s24, s20-s21, s27-s29, s28-s30, s36-s37, s38-s39, s41-s42, and s45-s49 were reassessed based on modification indices and theoretical foundations to augment the overall fit and predictability of our model.

When examining the fit indices related to the model, it's noteworthy that χ^2 and the degrees of freedom ratio, as well as NNFI and CFI values, show excellent fit. Meanwhile, the RMSEA, RMR, and Standardized RMR values exhibit good fit, but GFI and AGFI values are not as high as expected. Within this framework, it can be stated that the modeled factor structure has been confirmed and the scale is valid.

Higher Education Quality Indicators Faculty Member Scale Reliability Study

The findings obtained as a result of the reliability study of the developed measurement tool are presented below.

Table 8. *Higher education quality indicators faculty member scale reliability study*

	Cronbach's Alpha Internal Consistency Coefficient (α)
1. Education-Training	0.94
2. University Structure	0.90
3. Socio-Cultural Facilities	0.84
4. Internationalization	0.79
5. Economic Opportunities	0.72
6. Student Requirements	0.83
7. Accreditation	0.79
8. Preferability	0.68
9. Technology Proficiency	0.58
Overall	0.96

As can be seen in Table 8, the reliability coefficients of the scale dimensions are: "education-training" at 0.94, "university structure" at 0.90, "socio-cultural facilities" at 0.84, "internationalization" at 0.79, "economic opportunities" at 0.72, "student requirements" at 0.83, "accreditation" at 0.79, "preferability" at 0.69, "technology proficiency" at 0.58, and the overall reliability coefficient at 0.96. The "technology proficiency" dimension of the scale has low reliability ($0.40 \leq a<0.60$), the dimensions of socio-cultural facilities, internationalization, economic opportunities, student requirements, accreditation, and preferability are moderately reliable ($0.60 \leq a<0.90$), and education-training, university structure, and overall reliability are highly reliable ($0.90 \leq a<1.00$) (Özdamar, 2016).

In Table 9, the results of the item-total score correlation analysis of the higher education quality indicators faculty member scale are provided.

Table 9. *Higher education quality indicators faculty member scale item-total score correlation analysis results*

Item	*r*	*p value*	*n*	Madde	*r*	*p value*	*n*
1	.61*	.00	390	26	.56*	.00	390
2	.63*	.00	390	27	.54*	.00	390
3	.62*	.00	390	28	.52*	.00	390
4	.66*	.00	390	29	.53*	.00	390
5	.56*	.00	390	30	.58*	.00	390
6	.59*	.00	390	31	.59*	.00	390
7	.69*	.00	390	32	.58*	.00	390
8	.69*	.00	390	33	.61*	.00	390
9	.74*	.00	390	34	.49*	.00	390
10	.71*	.00	390	35	.60*	.00	390
11	.72*	.00	390	36	.49*	.00	390
12	.70*	.00	390	37	.53*	.00	390
13	.70*	.00	390	38	.65*	.00	390
14	.76*	.00	390	39	.70*	.00	390
15	.66*	.00	390	40	.64*	.00	390
16	.70*	.00	390	41	.61*	.00	390
17	.67*	.00	390	42	.59*	.00	390
18	.64*	.00	390	43	.52*	.00	390
19	.64*	.00	390	44	.45*	.00	390
20	.59*	.00	390	45	.51*	.00	390
21	.70*	.00	390	46	.46*	.00	390
22	.70*	.00	390	47	.43*	.00	390
23	.70*	.00	390	48	.44*	.00	390
24	.72*	.00	390	49	.37*	.00	390
25	.44*	.00	390				

* r > ,2. p < ,00

Upon examining Table 8 the item-total score correlation coefficients range from r= .37 to r= .76, and a significant relationship is observed at p< .01 level. Based on this result, it can be stated that the relationship between the items and the total score is positive and significant.

Table 9 provides the results of the independent samples t-test conducted between the lower and upper 27% groups of the Higher Education Quality Indicators Faculty Member Scale.

Table 10. *Results of the independent samples t-test between the lower and upper 27% groups of the higher education quality indicators faculty member scale*

Item	Group	*n*	$\bar{X}$	*ss*	*T*	*sd*	*p value*	Item	Group	*n*	$\bar{X}$	*ss*	*t*	*sd*	*p value*
1	Lower	105	4.22	.59	11.984	208	.00	26	Lower	105	4.24	.75	10.49	208	.00
	Upper	105	2.76	1.10					Upper	105	2.95	1.00			
2	Lower	105	3.81	.73	12.501	208	.00	27	Lower	105	3.76	.91	10.85	208	.00
	Upper	105	2.36	.93					Upper	105	2.34	.97			
3	Lower	105	3.84	.80	12.299	208	.00	28	Lower	105	3.68	.94	9.62	208	.00
	Upper	105	2.40	.89					Upper	105	2.40	.97			
4	Lower	105	3.85	.68	15.078	208	.00	29	Lower	105	3.24	.82	9.96	208	.00
	Upper	105	2.23	.86					Upper	105	2.01	.95			
5	Lower	105	3.62	.90	11.839	208	.00	30	Lower	105	3.40	.91	11.14	208	.00
	Upper	105	2.17	.88					Upper	105	2.04	.85			
6	Lower	105	3.95	.83	13.497	208	.00	31	Lower	105	3.97	.86	12.55	208	.00
	Upper	105	2.29	.93					Upper	105	2.37	.98			
7	Lower	105	4.02	.56	16.506	208	.00	32	Lower	105	4.27	.73	11.52	208	.00
	Upper	105	2.45	.79					Upper	105	2.81	1.06			
8	Lower	105	4.09	.74	14.853	208	.00	33	Lower	105	4.08	.82	12.72	208	.00

	Upper	105	2.40	.90					Upper	105	2.43	1.03			
9	Lower	105	4.00	.72	16.102	208	.00	34	Lower	105	3.26	1.13	9.66	208	.00
	Upper	105	2.26	.83					Upper	105	1.87	.94			
10	Lower	105	3.94	.75	16.329	208	.00	35	Lower	105	3.55	.84	11.31	208	.00
	Upper	105	2.21	.78					Upper	105	2.19	.89			
11	Lower	105	3.81	.80	15.725	208	.00	36	Lower	105	3.49	.88	9.62	208	.00
	Upper	105	2.05	.80					Upper	105	2.29	.91			
12	Lower	105	3.97	.56	15.455	208	.00	37	Lower	105	3.87	.80	10.02	208	.00
	Upper	105	2.31	.94					Upper	105	2.58	1.03			
13	Lower	105	4.25	.57	14.476	208	.00	38	Lower	105	4.06	.83	13.25	208	.00
	Upper	105	2.68	.95					Upper	105	2.39	.98			
14	Lower	105	3.95	.75	15.287	208	.00	39	Lower	105	3.92	.81	15.55	208	.00
	Upper	105	2.31	.80					Upper	105	2.20	.78			
15	Lower	105	3.98	.63	19.833	208	.00	40	Lower	105	4.02	.77	13.32	208	.00
	Upper	105	2.11	.72					Upper	105	2.42	.95			
16	Lower	105	4.095	.68	16.60	208	.00	41	Lower	105	3.81	.80	12.55	208	.00
	Upper	105	2.31	.85					Upper	105	2.31	.91			
17	Lower	105	3.48	.94	14.18	208	.00	42	Lower	105	4.06	.99	11.31	208	.00
	Upper	105	1.81	.76					Upper	105	2.49	1.02			
18	Lower	105	3.44	.89	13.42	208	.00	43	Lower	105	4.15	.94	10.43	208	.00
	Upper	105	1.82	.84					Upper	105	2.67	1.09			
19	Lower	105	4.17	.62	13.50	208	.00	44	Lower	105	3.77	1.01	7.33	208	.00
	Upper	105	2.77	.85					Upper	105	2.74	1.01			
20	Lower	105	3.74	.87	11.05	208	.00	45	Lower	105	3.66	.87	9.48	208	.00
	Upper	105	2.33	.96					Upper	105	2.43	.99			
21	Lower	105	3.75	.76	15.03	208	.00	46	Lower	105	4.03	.96	9.44	208	.00
	Upper	105	2.04	.87					Upper	105	2.63	1.17			
22	Lower	105	3.83	.81	16.08	208	.00	47	Lower	105	3.61	1.12	9.29	208	.00
	Upper	105	1.97	.87					Upper	105	2.25	.99			
23	Lower	105	3.61	.84	14.75	208	.00	48	Lower	105	4.22	.81	9.11	208	.00
	Upper	105	1.92	.81					Upper	105	3.04	1.05			
24	Lower	105	4.05	.70	17.11	208	.00	49	Lower	105	4.47	.63	7.54	208	.00
	Upper	105	2.19	.86					Upper	105	3,60	1.00			
25	Lower	105	3.54	.92	8.46	208	.00								
	Upper	105	2.43	.97											

p< .05

Upon examination of Table 10, a significant difference at the level of p< 0.05 is observed between the 27% lower and 27% upper groups in terms of items and the total score. This difference is determined to be in favor of the lower 27% group. It can be inferred that the reliability of the items in the scale is high, and the individuals scoring the scale are differentiated in terms of the intended characteristics.

DISCUSSION, CONCLUSION, RECOMMENDATIONS

The primary objective of this study was the formulation of a Likert-scale instrument intended to gauge the quality of higher education, premised upon the perspectives of academic faculty members. Likert scales, as stated by Tezbaşaran (2008), are measurement apparatuses developed to measure specific attributes. To validate the structural integrity of this instrument, an Exploratory Factor Analysis (EFA) was embraced, underpinning the assessment of structural hypotheses (Baykul, 2015). Preliminary to this factor analysis, the instrument met the prerequisites for EFA, as established by the KMO and Barlett's test outcomes. After the EFA, a scale comprising 49 items and partitioned into 9 sub-dimensions emerged. Drawing from extant literature, these sub-dimensions were named as: Education-Instruction, University Structure, Socio-Cultural Opportunities, Internationalization, Economic Opportunities, Student Requirements, Accreditation, Preferability, and Technological Competence. To assess the internal homogeneity of the instrument and its items, the Cronbach's Alpha coefficient was computed, a metric advocated by Tezbaşaran (2008) to determine scale consistency. Based on the obtained reliability coefficients for both the individual sub-dimensions and the scale in its entirety, the instrument displayed commendable internal cohesion and reliability.

In the quest to elucidate the alignment of the scale items with the targeted attribute, item-total and item-remainder correlation metrics were derived (DeVellis, trans. 2014; Tavşancıl, 2002). A salient positive and significant association was discerned from these coefficients, suggesting a substantive linkage between the scale items and the overall score, inherently reflecting the essence of the teaching profession. To further substantiate the reliability of this measurement tool, a test-retest methodology, as endorsed by Tezbaşaran (2008), was deployed. Results from this methodology manifested a positive and notable correlation between the overall score and the factors. Nevertheless, the t-test for dependent groups yielded no consequential disparities. In light of these observations, it can be posited with confidence that the crafted measurement instrument commendable reliability. The results presented above can be shown as evidence that the Higher Education Quality Indicators: Faculty Member Scale is valid and reliable. Following the validity and reliability studies and analyses, it was named "Higher Education Quality Indicators: Faculty Member Scale (HEQIFMS)". The final distribution of dimensions and items on the scale is as follows:

- Education and Instruction – 1, 2, 3, 4, 5, 6, 7, 8, 18, 19, 20, 22, 24, 25, 26, 30
- Structure of the University – 21, 32, 61, 62, 64, 65, 66, 67
- Socio-Cultural Opportunities – 36, 39, 41, 44, 45, 50
- Internationalization – 12, 13, 14, 16
- Economic Opportunities – 47, 48, 49
- Student Requirements – 52, 53, 57
- Accreditation – 43, 54, 55
- Preferability – 58, 59, 60
- Technological Competence – 9, 10, 34
- The developed Higher Education Quality Indicators: Faculty Member Scale is located in Appendix 1. Using the scale in future studies will both contribute to the validity and reliability of the scale and contribute to the field.

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APPENDIX 1.

QUALITY ISSUES IN HIGHER EDUCATION IN TURKEY: VIEWS OF FACULTY MEMBERS IN STATE UNIVERSITIES ON QUALITY

In the literature, indicators of higher education quality have been grouped under five main headings. These are instructional activities, scientific/research activities, physical facilities, socio-cultural opportunities, and administrative activities. For each item in the data collection tool, you are asked to indicate your level of agreement by marking the corresponding option next to the item.

	At the University/Institution I serve;	Your Level of Agreement				
		Strongly Disagree	Disagree	Neutral	Agree	trongly Agree
	Education and Instruction:					
1	The implemented curriculum is up-to-date.					
2	The program cultivates critical thinking skills.					
3	It promotes abstract thinking and reasoning abilities.					
4	The educational curriculum responds to societal changes and needs.					
5	It encompasses a variety of national and international cultures, reflecting cultural diversity.					
6	Offers courses that students can select based on their interests.					
7	The targeted learning outcomes are achieved.					
8	There is a constant pursuit to improve quality.					
9	Provides students with ample opportunities for professional development.					
10	The university offers active learning environments.					
11	Has mechanisms to evaluate the success of the educational programs.					
12	Equips students with professional skills that meet market demands.					
13	Student performance is evaluated in accordance with assessment principles.					
14	Process-based evaluation is incorporated.					
15	Offers adequate opportunities for individual student development.					
16	Students are encouraged to undertake scientific research.					
	University Structure:					
17	University constituents actively participate in decision-making.					
18	Sufficient resources are allocated for scientific research and studies.					
19	Quality is explicitly outlined in the university's strategic plan.					
20	Quality is ingrained in the university culture.					
21	Administrative rules and norms are transparent.					
22	Offers opportunities for self-expression.					
23	All stakeholders participate in quality improvement processes.					
24	Quality is embraced by the university management.					
	Socio-Cultural Facilities:					
25	Accommodation services offered to students meet expectations and needs.					
26	Offers a secure learning environment.					
27	Has the necessary infrastructure for sports and cultural activities.					
28	Provides suitable environments and tools for sports activities.					
29	Is renowned for its sports and cultural events.					
30	Offers social and cultural opportunities for leisure time.					

	Internationalization:					
31	Provides all facilities for international student admissions.					
32	Opportunities are offered for participation in international exchange programs.					
33	Collaborates with foreign universities.					
34	Offers education in foreign languages.					
	Economic Facilities:					
35	Offers scholarship opportunities that meet student needs.					
36	Provides employment opportunities for students in need within the institution.					
37	Offers students professional experience and internship opportunities.					
	Student Needs:					
38	Student satisfaction levels are evaluated.					
39	Efforts are made to determine student needs.					
40	Students are given the right to provide feedback on their education.					
	Accreditation:					
41	Educational programs are accredited by authorized institutions.					
42	Has an accredited quality management system.					
43	Certified by the Turkish Standards Institution (e.g., ISO 9001, ISO 22000, ISO 18001, ISO 15224, ISO 29990, ISO 31000).					
	Preferability:					
44	Ranked highly in student preferences.					
45	Graduates easily find employment.					
46	If given the opportunity, I would want to transfer to another university.					
	Technology/Academic Competence:					
47	Academic staff have competent skills in using technology.					
48	Adequate printed and electronic resources are available for accessing information.					
49	Provides access to international databases (e.g., EBSCOhost, Springer, ProQuest, etc.).					