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The PESPERF scale

An instrument for measuring service quality in the School of Physical Education and Sports Sciences (PESS)

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Abstract

Purpose – HEdPERF (Higher Education PERFormance) is one of the most recently developed scales in the literature to measure service quality in higher education. However, HEdPERF is designed to measure service quality at a macro level (university level) and may be considered as a more generic measurement instrument. In higher education, new scales with a much narrower focus may need to be developed for micro levels within a university because of the unique nature of different academic units. The purpose of this paper is to develop an instrument for measuring service quality in the School of Physical Education and Sports Sciences, PESPERF (namely Physical Education and Sports Sciences PERFormance).

Design/methodology/approach – A 30-item questionnaire on service quality in higher education was developed and tested for unidimensionality, reliability and validity using both exploratory and confirmatory factor analyses. In total, 320 physical education and sports sciences students participated in the study in a classroom setting.

Findings – Study results indicate that three dimensions (academic aspects, empathy, and access) capture the determinants of service quality in the School of Physical Education and Sports Sciences (PESS).

Research limitations/implications – Sample size, cultural factors and the complex nature of university customers limits one's ability to generalize these results to broader populations.

Practical implications – Through the use of service quality dimensions presented in this study, PESS administrators can successfully measure and monitor service quality perceptions in their institutions. Having identified the areas of service quality improvement priorities, administrators can allocate appropriate resources to encourage continuous service quality improvements.

Originality/value – This paper uses existing literature on service quality and develops an instrument that provides insights into measuring service quality for a specific academic unit within a university.

Keywords Higher education, Service quality assurance, Service improvements, Measurements, Turkey

Paper type Research paper

Introduction

The concept of service quality has attracted significant academic and practitioner interest in the last two decades or so, and several significant studies have investigated the measurement of service quality levels in different settings. Researchers have emphasized the considerable differences that exist in different service sectors and

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argued for the development of unique measurement instruments for different settings. These disagreements have mainly contributed to the development of several different scales for measuring service quality (Parasuraman *et al.*, 1985, 1988; Cronin and Taylor, 1992; Teas, 1993; Firdaus, 2006c; Angell *et al.*, 2008) in different settings.

Following a similar trend, there have been increased interests for studying service quality in the higher educational environment. Although one could argue that higher education institutions do not operate in competitive market conditions similar to the commercial businesses, they have to be concerned about the perceived service quality due to the significantly changing nature of higher education around the world. Using a similar logic in conceptualization of the role of service quality for service firms, it can be hypothesized that the higher educational institutions that do not provide high quality services will ultimately be marginalized and their effectiveness in achieving organizational goals will be jeopardized (Kotler and Fox, 1995). Accordingly, several attempts have been made to design specific service quality measurement instruments for higher educational institutions. Angell *et al.* (2008) most recently offered an 18-item importance-performance analysis (IPA) scale that specifically targeted postgraduate students. Authors concluded that IPA would be more suitable because of its ability to point to strategic matters. Another recent measurement instrument that has been specifically developed for measuring service quality in the higher education is called HEdPERF (Higher Education PERFormance) (Firdaus, 2006c). However, HEdPERF is designed to capture the determinants of service quality in a higher education sector at a macro level. HEdPERF includes statements that are designed to measure service quality at a university level but it is not specific enough to capture the unique characteristics of the lower level academic institutions such as the School of Physical Education and Sports Sciences (PESS).

Placing more emphasis on service quality in each academic unit (i.e. PESS) is as important as it is at the university level. Such emphasis will not only contribute to systemic quality improvements but will also create a culture that accepts the improvements in service quality as a long-term and continuous process and assumes that this is crucial for the success of the academic unit (PESS). Literature provides significant support to the relationship among student satisfaction, motivation, and loyalty (Elliott and Shin, 2002). Academic units, such as PESS, that provide high service quality will be able to attract better pool of prospective students and graduate more successful future teachers, coaches, and sports managers. These colleges play a pivotal role for knowledge development especially promoting physical health and strength for successful socio-economic development. Moreover, these institutions will have a positive image in their respective communities. In this process, there is a strong need for a service quality measurement instrument, which is specifically designed for the PESS, contributes significantly to the literature, as well as providing assistance to the practitioners in their efforts to operationalize service quality. Literature provides very limited research on PESSs. For instance, Yildiz and Bakir (2005) examined student perceptions of physical environments of PESSs and concluded the tangible physical environmental offerings by the college were considered very important by the students. Moreover, Yildiz and Cernaianu (2008) studied student perceptions of lecture quality in the PESSs and found that the students were significantly concerned about instruction quality and expected higher lecture quality in PESSs. Using student perceptions and expectations, both of these studies conducted on PESSs recommended

that measurement of service quality should be adopted as a continuous process by the school administration.

PESS differ from other schools due to their inter-disciplinary nature, importance attached to close student-teacher interaction, process orientation, and more focus on skills rather than knowledge (belief that physical education classes focus more on the psychomotor-physical-skills rather than cognitive-mental-skills). They focus on high-quality specialist expertise encompassing multiple disciplines and provide extensive training for mentors who guide the student on coaching/teaching (Donovan *et al.*, 2006). Appearance, quality, and standards of training facilities have significant importance to the students in the process of delivery of services. Quality assurance for all activities and individuals within the process is needed. Kirk and Kinchin (2003) studied student learning in physical and sport education and emphasized the student-centred nature of sport education and necessity of helping students to become more informed customers of physical activity and sport. In addition to the traditional learning and education materials, PESS students need to have access to other learning tools/equipment and need to be involved in the networking with the organizations that are closely related to their specializations. We argue that using standard measurement instruments independent from the context of particular service may not be ideal to assess the perceived service quality in all units within a higher educational institution. In this regard, there is conceptual support for the need for developing a service quality measurement instrument specifically designed for PESS.

The objective of this paper is to develop an instrument for measuring the perceived service quality of PESS education. Therefore, the critical determinants of service quality in PESS are identified and a unique instrument, PESPERF (Physical Education and Sports PERFormance), is developed and the results are presented in this study. The 30-item instrument has been empirically tested for its psychometric properties (unidimesionality, reliability and validity) using both exploratory and confirmatory factor analysis. We first provide a brief synthesis of the service quality literature on key conceptual issues. We then focus on issues related to measuring service quality in general, and higher education in particular, and provide arguments for the need for an exclusively designed instrument for PESS. Finally, we provide explanations regarding the development and testing process for PESPERF and offer directions for future research and use.

Theoretical background

Services and service quality

In general, a service may be defined as "any activity or benefit that one party can offer to another which is essentially intangible and does not result in the ownership of anything" (Kotler and Armstrong, 2003, p. 494). According to this definition, services are intangible and may be produced by people and/or machines. It includes a vast array of sectors such as banking, health, education, security, communication, transportation, etc. Generally, it is accepted that services have four unique characteristics namely intangibility, variability, perishability, and inseparability (Zeithaml *et al.*, 1985).

It is an observable trend that as the nations advance, their economies become increasingly more service-oriented. This significant shift towards a more service-oriented economy is one of the main reasons why some scholars forcefully

argue for a new paradigm in which service provision becomes more fundamental to economic exchange (Vargo and Lusch, 2004). The service-centered view is considered more customer-centric (Sheth *et al.*, 2000) and value is defined by the consumer. The increasing role and importance of services in today's competitive global economy have led companies to pay closer attention to service quality, which has been considered one of the most important challenges facing management today. However, the unique characteristics of services make conceptualization and measurement of service quality very challenging (Parasuraman *et al.*, 1985; Carman, 1990; Bolton and Drew, 1991). Although the exact wording may vary, service quality is defined as a form of attitude related to the superiority of the service (Parasuraman *et al.*, 1988). Moreover, customer expectations are seen as integral part of customers' levels of satisfaction with service quality.

Although customer satisfaction and service quality may be considered as two related constructs, the relationships between these two constructs are not very clear. Parasuraman *et al.*(1988), Bitner (1990), Bolton and Drew (1991) and Boulding *et al.* (1993) suggest that service quality and satisfaction are two different constructs. According to Oliver (1981), consumers form an attitude about a service provider on the basis of their prior expectations about performance of the firm, and this attitude affects their intentions to purchase from that organization. Lewis and Booms (1983) define service quality as the measurement of discrepancy between the services provided and the customers' service expectations. An analysis of the literature reveals at least three different views of the relationship between service quality and the customer satisfaction. The first view argues that service quality is the precursor to customer satisfaction (Cronin and Taylor, 1992; Anderson *et al.*, 1994; Parasuraman *et al.*, 1994; Brady *et al.*, 2002) and higher levels of perceived service quality result in increased customer satisfaction. The second view, on the other hand, suggests that satisfaction is an antecedent of service quality, which is assumed as a form of attitude, and satisfaction is seen as a distinct construct that mediates service quality (Bitner, 1990; Bolton and Drew, 1991). Finally, the third view evaluates the process as a comprehensive framework and argues that service quality should be conceived as antecedents rather than components of customer satisfaction and the customer satisfaction mediates the effects of service quality on intentions (Dabholkar *et al.*, 2000).

Measurement of service quality

As there is no clear consensus among researchers regarding the conceptualization of service quality and differing views exist with respect to measuring service quality. Although the measurement of the service quality generally relates to consumer evaluations and perceptions, a major debate has mostly focused on whether service quality should be measured as perceptions—perceptions of service quality more closely match customer evaluations of the services provided (Cronin and Taylor, 1992) or as disconfirmation – the difference between perceptions and expectations (Parasuraman *et al.*, 1994).

The conceptual model developed by Parasuraman *et al.*(1985) uses service quality as the key outcome variable. They argued that consumers' service quality perceptions are influenced by a number of gaps, which is the difference between performance perceptions and expected levels of service. From this perspective, service quality depends on the size and direction of the gap between expected and perceived service.

Service quality perceptions will be favorable if the service delivery exceeds the customer expectations or will be unfavorable when service expectations are not met. To measure perceived service quality, these authors conducted extensive exploratory research which resulted in ten overlapping dimensions — tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding/knowing customer, and access — to assess the service quality.

Parasuraman *et al.* (1988) later developed SERVQUAL (a multiple-item scale for measuring service quality) to measure the difference between customer service expectations and services received (performance perceptions minus performance expectations). SERVQUAL consists of 22-item scale which is used as a basis for identifying these five components (tangibles, reliability, responsiveness, assurance, and empathy). Although SERVQUAL has been considered one of the major contributions to the conceptualization and measurement of service quality literature, it has received criticism regarding the validity of its five dimensions when subjected to cross-sectional analysis (Babakus and Mangold, 1992). Also, Carman (1990) argued that there is a little theoretical support with regards to the relevance of service expectations-performance gap as a basis of measuring service quality. Also, researchers argued that there might be a possibility of existence of up to nine dimensions of service quality depending on the type of service sector under investigation. Similar criticism was also raised by several other researchers (Cronin and Taylor, 1992; Babakus and Boller, 1992; Teas, 1993; Brown *et al.*, 1993). Cronin and Taylor (1992) argued that the conceptualization and operationalization of SERVQUAL was inadequate and cited relevant marketing literature (Bolton and Drew, 1991; Churchill and Surprenant, 1982; Woodruff *et al.*, 1983) supporting simple performance-based measures of service quality. Hence, SERVPERF – the performance-based measure of service quality – (Cronin and Taylor, 1992) was developed to measure service quality as an attitude using the five components and 22-items of SERVQUAL. Another alternative model to SERVQUAL was developed by Teas (1993), who argued that the disconfirmation model had conceptual, theoretical, and measurement problems and suggests that alternative perceived quality models be used. His studies result in an alternative perceived service quality measure called evaluated performance (EP). EP focuses on the gap between perceived performance and the ideal point on a feature instead of customers' expectations. Despite its criticism, SERVQUAL is still considered a most widely used measure of service quality in variety of the sectors such as hospitality management (Saleh and Ryan, 1991), hospitals (Lam, 1997; Pakdil and Harwood, 2005), information services industry (Landrum and Prybutok, 2004), airline services (Pakdil and Aydin, 2007), banking, hair salons, and dental services (DeMoranville and Bienstock, 2003).

Measurement of service quality in higher education

Based on the ideas of Juran, Deming, and Crosby, total quality management (TQM) is a widely recognized management philosophy. The main objective of TQM is to ensure the ongoing improvements of service to meet or surpass the customer expectations. In this process, TQM encourages colleges and universities to collect data to measure the progress in key areas in comparison to benchmarks. Earlier literature provides support for the use of TQM model in the higher education (Koch and Fisher, 1998). Although the applicability of the TQM philosophy and the theories in the education sector has

attracted interest (Sahney *et al.*, 2004), the theoretical compatibility of the measures has been controversial (Harvey, 1995). Accordingly, Srikanthan and Dalrymple (2002) provides an account of the quality management models applied to higher education, often without much success, and suggested a holistic model embodying an organizational culture of learning within the university. Furthermore, some higher educational institutions have applied different quality models such as European Foundation for Quality Management (EFQM) Excellence based on TQM principles and concepts (www.efqm.org).

As emphasized earlier in this paper, delivering service quality has been perceived as an important goal for higher educational institutions (Russell, 2005). Being in a service industry, higher educational institutions need to adopt or develop means to measure quality of services and satisfaction of their customers similar to commercial firms (Sahney *et al.*, 2004). Some scholars argued that classifying students as "customers" is inappropriate because accepting them as customers may counteract the power relationships (Svensson and Wood, 2007; Sines and Duckworth, 1994). However, Angell *et al.*(2008) emphasized that objecting to the idea of the students being customers on the basis of a very narrow view ignores the realties that universities are experiencing around the world. In this study, we argue that specific characteristics of higher education and the unique role of students as both "customers" as well as "products" complicate the measurement of service quality construct in higher education. The literature provides extensive discussions on this topic and variety of alternative measurement models presented by the researchers (refer to Angell *et al.* (2008) for detailed discussions on this issue). Moreover, the literature review presented earlier in this paper supports the view that there is no single best measurement instrument of service quality that could be used in every services sector. Specific items in the measurement instruments have to be modified so that it becomes more applicable to the particular service sector being investigated.

While SERVQUAL has also been directly applied to the higher education sector (Wright and O'Neill, 2002; Tan and Kek, 2004; Barnes, 2007), it has been significantly criticized. For instance, Cuthbert (1996) argued that SERVQUAL instrument is insufficient to measure service quality in higher education because it lacks focus and the higher education service is very complex. In general, the higher education experience is considered to have two overlapping areas: the evaluation of quality of teaching and learning and the evaluation of student experience (Aldridge and Rowley, 1998; Rowley, 1997; Hill, 1995). Therefore, to measure service quality in the higher education, it is argued that specific instruments should be developed and used. Similar concerns have been raised by Li and Kaye (1998). As a result, while some studies tried to measure service quality in the higher education without using any specific measurement instruments available in the literature (Khan *et al.*, 2008; Sakthivel and Raju, 2006; Petruzzellis *et al.*, 2006; Voss *et al.*, 2007), Firdaus (2006a, b, c) has developed HEdPERF (Higher Education Performance), a four-dimensional construct to measure service quality within the higher education sector. A recent study by Brochado (2009) compares the performance of alternative measures of service quality in the higher education sector and concludes that SERVPERF and HEdPERF presented the best measurement capability but presented inconclusive results with respect to reliability and consistency.

However, HEdPERF scale has been mainly designed to measure service quality at a university level. For instance, HEdPERF contains scale items such as health and dormitory related services which are provided by the university administration not by the specific schools or units in a given university. Moreover, it does not contain statements about some of the most frequently used or needed services (Wilson, 1995; Aladwani and Palvia, 2002) such as electronic library and web services. We argue that health and dormitory related service issues do not directly influence the service quality of a specific unit, such as PESS, while electronic library resources and web-based services do have correlations with student judgments of service quality. Furthermore, PESS have their unique characteristics in comparison to other schools in a given university. Perhaps the most specific characteristics of the PESS originate from the placement of higher emphasis on physical activities in their programs (Mohnsen, 1997). Physical education places higher emphasis on "learning in a physical context" to develop knowledge, skills and understanding, and promote physical development (Lee, 2004). This heavy reliance on physical activities in the PESS result in specific characteristics, which differentiate them from the other schools in a university in terms of academic programs, educational materials and facilities. Hence, the existing service quality measurements instruments such as HEdPERF are not applicable to measure service quality in PESS. In this study, we propose and test PESPERF (Physical Education and Sports PERFormance). Students' perceptions of academic quality relate to standards and students' views on all aspects of their higher education experiences are regarded as essential in delivering quality offerings (Lawrence and Sharma, 2002). Therefore, PESPERF is based on student perceptions of services and includes statement items that are specifically designed for the PESS while excluding items that are generic in nature (see Table I for a list of different service quality measurement instruments including PESPERF).

Methodology

Research objectives

Based on the conceptual and operational issues discussed with regard to the standard measures of service quality, this research uses a two-stage process that develops and empirically tests a unique measurement instrument, called PESPERF for measuring

	No. of items			
	SERVQUAL (Perception-expectation)	SERVPERF (perception only)	HEdPERF (perception only)	PESPERF (perception only)
Non academic aspects	–	–	15	–
Academic aspects	–	–	10	14
Tangible	4	4	–	–
Rehability	5	5	5	–
Assurance	4	4	5	–
Responsiveness	4	4	–	–
Empathy	5	5	–	12
Access	–	–	–	4

Table I.
Dimensions of alternative service quality instruments

service quality in PESS. In this process, we test the scale's unidimensionality, reliability and validity to assess its psychometric properties.

Research design

Generation of scale items. Items representing different components of service quality in the PESS were developed based on a comprehensive literature review and several in-depth interviews with students as well as brainstorming with experts (coaches, teachers, animators, sports managers) in the field. Specifically, in-depth interviews were conducted to develop a conceptual framework of service quality in PESS. Discussions were mainly focused on identifying the key attributes for service quality, problems and issues involved, discrepancies between students and other key stakeholders, and to uncover key dimensions that are mostly accepted by all stakeholders. This approach is consistent with the procedures recommended in the literature (Parasuraman *et al.*, 1985). Based on these in-depth interviews and literature review, we were convinced that a very consistent pattern with respect to criteria in evaluating service quality in PESS has emerged from different stakeholders. A scale that is designed to measure service quality in PESS should include questions related to buildings and facilities (such as classrooms, library, reading rooms, conference room, labs, bathrooms, resting areas, social space and parks), sports facilities (sports fields, showers and locker rooms, and cafeteria), educational materials (books, digital and physical journals, computers, internet access, and web presence), sports equipment and tools (tools that are used in more hands-on application oriented courses), personnel (academic, administrative and staff), extracurricular activities (student union, social, cultural, and sports events), courses (sports, pedagogy, and theoretical/practical general education courses), and *practicum* (teaching, coaching, sports management, recreation). After the generation of scale items, we went back to the experts to check the clarity and representativeness of all statements.

Questionnaire, pilot testing, and data collection. Data for the study were collected using structured questionnaires developed to measure service quality in the PESS. Questionnaires included two main sections—scale items and demographics. The first section of the questionnaire included 30 items designed to measure service quality measured on a seven-point Likert type scale (1 = "Strongly disagree" and 7 = "Strongly agree"). Nearly half of the items were negatively worded. The draft questionnaire developed was subjected to pilot test with a total of 55 subjects and the experts (coaches, sports managers, and teachers) in the field and they were asked to comment on meaningfulness, clarity and simplicity of the items. Relatively minor wording changes were made based on feedback received.

According to Higher Education Board (YOK), there are 84 state and 31 private universities in Turkey (www.yok.gov.tr). Among these higher educational institutions, only 45 universities (most of which are state institutions) have schools that offer PESS programs. There are a total of 18,991 students enrolled in these institutions (www.osym.gov.tr). Nunnally and Bernstein (1994) recommend a minimum of five respondents per scale item as a benchmark for appropriate sample size, which would require a minimum of 150 completed questionnaires for our study. Our goal was to get twice as many as this minimum threshold to get a better representation of the student population. The questionnaire distributed to 345 PESS students along with a cover letter explaining the objective of the study and asking for their participation. Of the

total, 338 questionnaires were returned and 18 were discarded due to incomplete responses, thus leading to 320 usable questionnaires for a population of 18,991 PESS students (1.69 percent of the total population) in Turkish higher educational institutions (www.osym.gov.tr).

Data analysis and results

Descriptive as well multivariate statistical techniques were used to analyze the data. The overall objectives of the analysis were to validate and assess the dimensionality of PESPERF. Table II shows that approximately 60 percent of the subjects who participated in the study were males and 40 percent were females. With respect to the age distributions of the subjects, the majority of the subjects (about 60 percent) were in the 21-25 year old age group and only 5 percent of the subjects were above the age of 26. Subjects were selected approximately equally from three common majors in the PESS (Teaching, Coaching, and Sports Management majors). Finally, freshmen, sophomore, junior and senior status distributions were approximately at 11 percent, 24 percent, 28 percent, and 37 percent, respectively. This is relatively a good representation of gender, age, and student majors. Moreover, our sample represents larger proportions of students at later stages of their studies (juniors or seniors) because students who had longer contact with the institution would have developed more realistic service quality perceptions. Sample representativeness was assessed by comparing our sample demographic characteristics to the most recent information available in the literature that used much larger sample sizes (Yildiz and Bakir, 2005).

Variables	*f*	%
Gender		
Male	194	60.6
Female	126	39.4
Total	320	100
Classes		
First class	35	10.9
Second class	78	24.4
Third class	89	27.8
Fourth class	118	36.9
Total	320	100
Ages		
20 and below	113	35.3
21-25	190	59.4
26 and above	17	5.3
Total	320	100
Departments		
Physical Education and Sports	108	33.8
Coaching Education	79	24.7
Sports Management	133	41.6
Total	320	100

Note: $n = 320$

Table II.
Sample characteristics

This comparison revealed that we have obtained very reasonable sample characteristics of the population.

Test for validity and reliability

Service quality constructs used in the literature for higher education institutions have been identified. Furthermore, along with detailed literature review, our study included in-depth interviews with experts in the PESS environment in the development of the items for PESPERF providing both face and content validity. To test for construct validity, scale items were analyzed using principal components (PCA) method of factor analysis with Varimax rotation (Table III). We retained factors with eigenvalues over 1.0. Results of exploratory factor analysis show the existence of three main dimensions explaining 76 percent of the total variance. Factor loadings of the scale items are relatively large ranging from 0.538 to 0.872, which are significantly more than the minimum acceptable threshold of 0.30 (Hair *et al.*, 1995; Grandzol and Gershon, 1998), indicating adequate support for construct validity. The first factor has 14 items and explains the largest variance (34 percent). The second factor contains 12 items and explains 26 percent of the total variance and finally, the third factor has 4 items explaining 16 percent of the total variance. Furthermore, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is used to assess the appropriateness of factor analysis (Hair *et al.*, 1995). The KMO measure is computed and the results indicate and index of 0.973 ensuring and excellent sampling adequacy and supporting the factor structures determined.

We used the items loaded in each factor to assign factor names for PESFERF dimensions. The first factor delineates a cluster of relationships among 14 items related to sports facilities, sports equipment, academic content, programs and opportunities, course materials and knowledge based, and information technology. Considering the specific academic environment of the PESS, we label this factor as Academic Aspects. In the PESS setting, academic aspects include not only course content, materials, academic staff knowledge but also physical facilities and tools that are crucial in the process of delivering educational services. The second factor consists of 12 items related to kept promises, quality and fairness, solutions offered, communications, and dealing with student problems effectively. We label this factor as Empathy. Surprisingly, this factor also included items related to perceived knowledge and appearance of the academic and administrative staff. However, one needs to evaluate these within the context of the study. It is possible that these statements were considered as "trustworthy and credible" and hence became part of this factor. Moreover, this factor contains items that are mostly related to trustworthiness and empathy statements. Therefore, the Empathy dimension in PESPERF may be defined as understanding student needs and wants, offering concrete solutions to their specific needs while being trustworthy and credible. Finally, the third factor consisted of 4 items related to accessibility and availability of facilities, equipment, and materials. Hence, this factor is labeled as *Access*. The reliability of PESPERF scale is assessed using Cronbach's alpha (Cronbach, 1951). The values of Cronbach alpha obtained for three factors ranged from 0.921 to 0.975 indicating excellent reliability scores and exceeding significantly 0.70 thresholds cited in the literature (Nunnally and Bernstein, 1994).

	Scale items	M	SD	F1 AA	F2 Em	F3 Ac
1.	This institution has an ideal location with excellent campus layout and appearance	4.36	2.21	.835		
2.	Sports facilities are adequate and have professional appearance	4.53	2.29	.872		
3.	Academic and administrative staff have professional appearance	5.29	1.58		.538	
4.	Sports equipments and tools along with course materials are up to date and technologically superior	4.67	2.19	.840		
5.	Schools web site is excellent and effective	4.48	1.95	.619		
6.	Buildings and facilities are sufficient	4.54	2.29	.791		
7.	Sports facilities meet international standards	4.55	2.33	.775		
8.	Buildings and sports facilities have required safety features	4.74	2.20	.720		
9.	This institution offer high quality academic content and knowledge base	4.74	2.18	.748		
10.	Academic and administrative staff are highly educated have required knowledge experience in their fields	5.13	1.97		.560	
11.	Sports equipments and tools meet course requirements	4.61	2.29	.748		
12.	This institution offers wide range of programs and course contents are current and meet student expectations	4.89	2.14	.688		
13.	This institution offers very rich extracurricular activities	4.57	2.12	.659		
14.	This institution offers significant opportunities, outside the classroom experience, to its students to improve their skills, knowledge, and experience in relevant fields of interests	4.33	2.20	.698		
15.	The web site of this institution is very up to date and useful	4.36	2.29	.738		
16.	Students have easy access to campus building and sports facilities when needed	5.14	1.81			.751
17.	Academic and administrative staff are readily available or accessible when needed	5.39	1.60			.635
18.	This institution provides easy access to the academic materials and course content	4.99	1.93			.617
19.	Students can easily access and use sports equipments and tools	4.87	1.99			.603
20.	Students can improve their skills and knowledge in their related fields by using the opportunities available outside classroom	4.61	2.10	.616		
21.	In this institutions, things get done on time and right on first time	4.95	1.91		.591	
22.	Promises are kept in this institution	5.18	1.88		.672	
23.	This institution treats everybody equally and fairly	5.05	2.31		.669	
24.	In this institution, solutions to problems are offered on-time	4.95	1.99		.691	
25.	Academic and administrative staff communicate well with students and treat them politely	5.37	1.72		.709	

(*continued*)

Table III.
Results of factor analysis and reliability coefficients

	Scale items	M	SD	F1 AA	F2 Em	F3 Ac
26.	Personal information in this institution is kept strictly confidential	.5.53	1.77		.594	
27.	Student interests are always protected in this institution	5.13	1.85		.724	
28.	Students receive individualized attention in this institution	4.97	1.87		.817	
29.	This institution is very sensitive to student problems and complaints	5.17	1.95		.750	
30.	This institution is really cares about students' well-being	5.55	1.74		.800	
Mean		4.95		4.57	5.19	5.10
Standard deviation			1.60	1.92	1.57	1.62
Percentage of variance explained				34.187	25.812	16.144
Cumulative % of variance explained				34.187	59.999	76.143
Cronbach alpha				.975	.921	.958

Table III.

Notes: F = Factor; AA = Academic Aspects; Em = Empathy; Ac = Access

The next set of analyses involved efforts to examine the dimensionality of PESPERF. The sample correlation matrix of PESFERF items was first examined using Bagozzi's (1981) rules for "convergence" in measurement. The rules indicated that items representing a distinct dimension should correlate highly with each other. Sample correlations are presented in Tables IV-V.

A careful examination of the correlations matrix indicates that rules for convergence hold. For instance first 14 items represent the Academic Aspects dimension of service quality and they converge very well by exhibiting uniformly high correlations among themselves hence confirming proposed dimensionality of the PESPERF. In general, these results indicate that proposed dimensionality of PESPERF is good. To further assess the proposed three-dimensional structure (second order abstraction of the construct), a measurement model was specified for PESPERF and confirmatory factor analysis (CFA) is performed for all constructs using Analysis of Moment Structures, AMOS (Amos 7.0 User's Guide, 2006). More specifically, the underlying factor structure of PESPERF scale items in the model is examined to see how closely they represented the specified construct. In contrast to exploratory factor analysis, where loading are free to vary, CFA allowed us to test the hypothesized model structure and force specific scale items to load on a single factor. Figure 1 presents the measurement model and Table VI presents analysis results and model fit indices.

To assess whether a model fits the data, several indices of fit were examined. The Chi-square likelihood ratio test statistic, which assesses overall model fit by testing whether the model replicates the pattern of covariations among the observed variables, is reported. A low and non-significant Chi-square value indicates a good fit of the model to the data. Additional indices that are reported include root mean square error of approximation (RMSEA), goodness of fit index (GFI), and adjusted goodness of fit index (AGFI) (Browne and Cudeck, 1993; Byrne, 2001). Generally, a RMSEA values less than 0.10 is considered an acceptable fit. Similarly, values close to or above 0.90 on GFI

Items	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15
I1	1														
I2	0.887	1													
I3	0.597	0.606	1												
I4	0.810	0.859	0.628	1											
I5	0.590	0.608	0.465	0.665	1										
I6	0.728	0.795	0.495	0.774	0.602	1									
I7	0.718	0.784	0.449	0.766	0.564	0.891	1								
I8	0.686	0.755	0.469	0.738	0.542	0.780	0.825	1							
I9	0.745	0.794	0.530	0.782	0.607	0.831	0.830	0.823	1						
I10	0.598	0.653	0.590	0.696	0.567	0.743	0.739	0.739	0.798	1					
I11	0.723	0.774	0.512	0.787	0.612	0.839	0.834	0.771	0.881	0.508	1				
I12	0.700	0.741	0.499	0.745	0.598	0.774	0.752	0.729	0.847	0.776	0.824	1			
I13	0.635	0.690	0.432	0.676	0.730	0.709	0.719	0.682	0.768	0.704	0.764	0.750	1		
I14	0.693	0.716	0.464	0.698	0.561	0.816	0.785	0.730	0.801	0.735	0.791	0.797	0.713	1	
I15	0.741	0.780	0.527	0.792	0.591	0.813	0.814	0.768	0.832	0.779	0.848	0.822	0.762	0.859	1

Table IV.
Inter-item correlations of the PESPERF

Table V.
Inter-item correlations of the PESPERF

	I16	I17	I18	I19	I20	I21	I22	I23	I24	I25	I26	I27	I28	I29
I16	1													
I17	0.694	1												
I18	0.683	0.668	1											
I19	0.706	0.651	0.856	1										
I20	0.620	0.599	0.764	0.790	1									
I21	0.642	0.712	0.795	0.791	0.740	1								
I22	0.589	0.658	0.713	0.723	0.705	0.850	1							
I23	0.570	0.624	0.705	0.745	0.690	0.792	0.827	1						
I24	0.575	0.632	0.712	0.736	0.759	0.812	0.814	0.844	1					
I25	0.530	0.632	0.678	0.652	0.644	0.742	0.761	0.744	0.772	1				
I26	0.441	0.520	0.520	0.504	0.520	0.633	0.595	0.545	0.627	0.614	1			
I27	0.503	0.565	0.598	0.601	0.631	0.710	0.697	0.688	0.700	0.673	0.526	1		
I28	0.397	0.533	0.555	0.560	0.624	0.636	0.660	0.679	0.706	0.639	0.522	0.753	1	
I29	0.498	0.589	0.634	0.6660.	0.703	0.705	0.745	0.742	0.776	0.681	0.510	0.737	0.785	1
I30	0.412	0.575	0.584	0.583	0.587	0.657	0.682	0.744	0.706	0.697	0.508	0.654	0.722	0.779

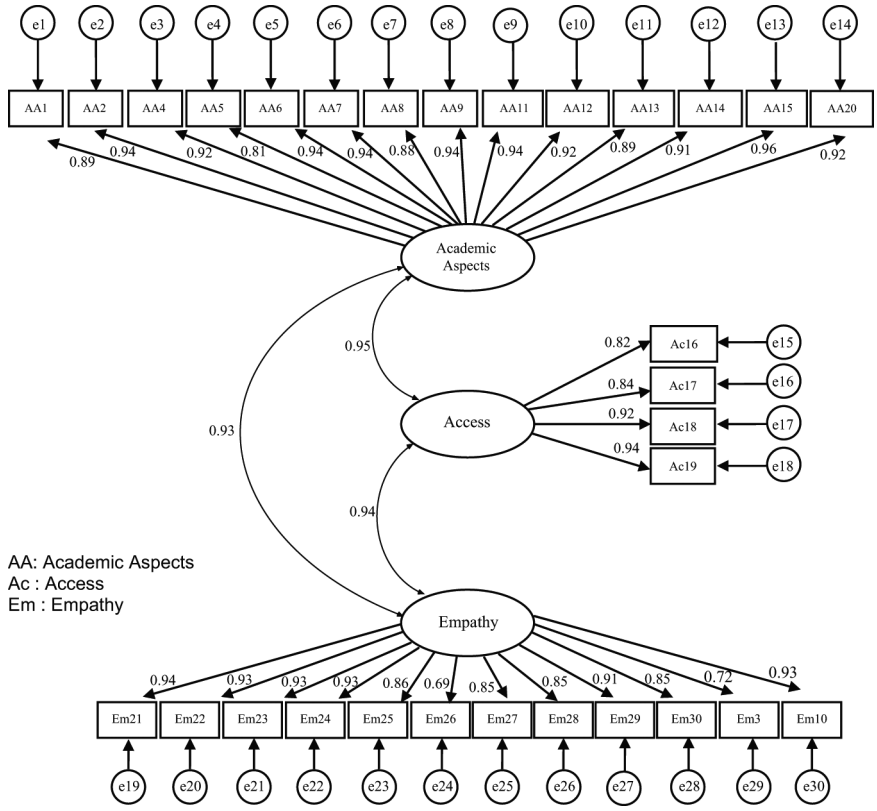

Figure 1.
Confirmatory factor analysis (CFA) of PESPERF instrument

Measure of fit	HEdPERF	SERVPERF	SERVQUAL[a]	PESPERF
Chi-square at $p < 0.001$	2404.57	613.89	390.38	953.42
Degrees of freedom	726	200	204	402
RMSEA	0.07	0.08	-	0.066
GFI	0.75	0.87	0.83	0.801
AGFI	0.71	0.83	0.79	0.77

Notes: [a] Average numbers are reported
Sources: Firdaus (2006); Cronin and Taylor (1992)

Table VI.
Unidimensionality of different Instruments

is considered acceptable. For this study, the test for equality of covariances and means yields a Chi-square of 953.42 with 402 degrees of freedom ($p < 0.001$) and a RMSEA of 0.066. It is known that Chi-square has limitations in assessing model fit due to its sensitivity to larger sample sizes and therefore it is advised to use other measures of model fit for more pragmatic process of model fit evaluation. The GFI is an indicator of the amount of variance and covariances accounted for by the model and in general it is considered a reliable measure of model fit. RMSEA, on the other hand, measures the

discrepancy for each degree of freedom (how well would the model fit the population covariance matrix). We argue that the overall confirmatory factor analysis for PESPERF scale with three latent constructs that resulted in 0.801 GFI and 0.066 RMSEA with 402 degrees of freedom represents adequate fit. There are similar results presented in the literature (Lukas *et al.*, 2001) that considered similar fit indices as "moderate but acceptable." Moreover, the model fit statistics obtained in this study become more meaningful when compared to the measures obtained in the literature for alternative service quality measurement instruments (Table VI). Furthermore, standardized solution's factor loadings significantly exceeded 0.50 and all factor loadings were highly significant and no standard error was out of range. The three dimensional structure of PESPERF is related to service quality and is not totally different from what is presented in the literature.

Discussions and conclusion

Examination of service quality levels can help us to better understand consumer behavior and satisfaction levels with service offerings. While the importance of service quality is widely accepted, significant disagreements exist with respect to its measurement. These disagreements led researchers to develop several different service quality measurement instruments (SERVQUAL, SERVPERF, HEdPERF, and so on) presented in the literature. However, despite their availability, there is no consensus among researchers with respect to which one should be used to measure service quality (Firdaus, 2006a; Sakthivel and Raju, 2006). We argue that most of the disagreements in the literature are caused by the complex nature of services.

Literature suggests that higher education institutions should proactively monitor the quality of services they offer and make the changes needed for continuous improvements. However, the measurement of service quality is even more complicated in the field of higher education because of the complementary and contradictory "customers" and "constituents" for higher educational institutions. Although students are considered both products as well as customers, students are frequently described as customers of higher education (Lawrence and Sharma, 2002) and their perceptions of the aspects of higher education is widely accepted as essential to the quality in universities (Hill *et al.*, 2003). Furthermore, as the environment of higher education has changed significantly (the rapid expansion of schools and universities, increased competition for limited number of student pool due to demographic shifts, and significant increases in schools education costs) schools have been forced to think differently about the role of student satisfaction for their survival (Kotler and Fox, 1995). Therefore, complexity related to the unique nature of higher education institutions combined with disagreements among scholars with respect to the applicability of different measurement instruments, further complicates the issue of service quality in higher education.

There are several different studies in the literature that have been designed to measure service quality in the higher education. Cuthbert (1996) argues that the most frequently used service quality measurement instrument, SERVQUAL would not be sufficient to measure the dimensions of service quality in higher education. To this end, Li and Kaye (1998) suggest that SERVPERF could be more effectively used to measure service quality in higher education. However, more recently Firdaus (2006b) has developed a specific measurement instrument—HEdPERF—for higher education and

provided comparative results for its performance against the existing, more generic service quality measurement instruments. However, using the similar arguments that Firdaus (2006b) has made, in this study, we argue that HEdPERF is a generic scale designed specifically for the university level rather than a unit within a university. Differences among units within a university may be observed easily, especially when the PESS are considered. Perhaps most of the specific characteristics of the PESS originate from the placement of higher emphasis on physical activities in their programs and offerings (Mohnsen, 1997). Heavy reliance on physical activities and the process in the PESS result in specific characteristics, which differentiate them from the other schools in a university in terms of academic programs, educational materials and facilities.

Hence, the primary objective of the study was to construct and validate a new instrument for measuring service quality in the PESS. PESPERF contains 30 items and a three factor structure (Academic Aspects, Empathy, and Access). Using an empirical study, we tested the unidimensionality, reliability and the validity of the instrument. Our findings indicated PESFERF's internal consistency was very high (Coefficient alpha greater than 0.95). All correlations between the PESPERF and its related constructs are very high and statistically significant. This study provides additional support to the existing literature with regard to the importance of putting more emphasis on service quality in the PESS. College administrators need to understand the importance of service quality and implement improvement procedures in their academic institutions for long-term success. The literature provides significant support for the relationship among student satisfaction, motivation, and loyalty (Elliott and Shin, 2002). PESS that provide high service quality will be able to attract a better pool of prospective students and graduate more successful future teachers, coaches, and sports managers. Moreover, these institutions will have a more positive image in their respective communities. The availability of a service quality measurement instrument, such as PESPERF, which is specifically designed for the PESS, contributes significantly to the literature as well providing assistance to the practitioners in their efforts to operationalize service quality.

Academic and practical implications

The instrument developed in this study is inclusive in nature to identify the dimensions of service quality that are valued the most by PESS students. PESPERF offers a highly reliable and valid tool for collecting data from the respondents, namely students of PESS, in order to measure the level of education service quality. Our study findings indicated that the education service quality in PESS can be defined as a function of three dimensions pertaining to academics, empathy and access. From this perspective, PESPERF is closely associated with the HEdPERF measurement model but fine tunes the specific measurement dimensions for the PESS environment. In other words, we argue that a comparative examination of scales similar to Brochado (2009) study should prove to yield better performance for PESPERF in the PESS environment using variety of the performance measures.

Improvements made in the areas academics, empathy and access by the PESS administrators will increase the service quality perceptions of students for that particular institution. Therefore, PESS administrators can periodically administer PESPERF to their students to become more attuned to changing student perceptions,

investigate the causes, and make the necessary adjustments on specific dimensions to improve service quality at their institutions. Institutionalizing such a continuous quality improvement process and intelligence gathering system will result in higher customer value and satisfaction for the PESS. Accordingly, we recommend that this instrument should serve as a guiding principle for monitoring the progress of education service quality and continuous improvement. Moreover, such information could also be periodically collected from the prospective students to understand the existing service quality perceptions among these future students and marketing communication programs could be designed to influence students' perceptions.

While contributing to the existing knowledge about the measurement of service quality in the higher education, the study findings highlight the importance of specifically designed practical measurement scales for unique organizational settings. Scholars have a tendency to develop a generalizable measurement instrument that could be used by all institutions in all settings. Although setting such goals are important in scientific inquiry, universally accepted single measurement instruments may result in invalid outcomes and impractical solutions due to the complex nature of service delivery organizations and environment. Focus on the specific aspect of the complex service experience is the most valuable way to reduce the measurement errors. Adding to the complexity of this issue is the differing perspectives in terms of the value of understanding service quality evaluations. Our view is consistent with the conceptualization that "quality leads to satisfaction and retention". However, understanding the relationships among service quality, overall customer satisfaction, recruitment, and retention in the higher educational environment is an important area for future research. The future research agenda should focus on these critical issues that remain unresolved.

Limitations and future research

A few limitations of this study are noted but we argue that these should be seen as opportunities to design and develop future studies. First of all, sample size used in this study limits our ability to generalize these results to broader populations. The sample was collected from a single university mostly based on a convenience sampling. Also, data were collected from current students who were enrolled in college during their time of study. We note that former students or graduates could provide valuable input in the process of developing an instrument to assess service quality. Therefore, future studies that use a more comprehensive sample and sampling methods could significantly improve the generalizibility of the results and some of such studies are already underway. The second limitation of the study has something to do with a more complex issue that is mentioned earlier. Students in this study are assumed to be the primary customers of PESS (Gremler and McCollough, 2002; Hill, 1995; Sander *et al.*, 2000; Kara and DeShields, 2004). However, a more inclusive conceptualization of service quality should include all internal and external stakeholders including academic, administrative, and staff. Hence, future researchers should attempt to incorporate service quality perceptions of multiple stakeholders of PESS. Third, this study was conducted in a large university in Turkey. Considering the different cultural, competitive and market environments of PESS in different countries, generalizibility of the results should not be extended beyond its national boundaries. PESPERF needs to be tested in different countries and environments to incorporate the

role of cultural influences in implementing an effective service quality program. Also, researchers can investigate the effects of culture and other specific factors on perceptions of service quality and satisfaction. Further studies should apply this measurement instrument in other countries and with different types of institutions in order to test PESPERF's consistency across samples. Similarly, studies can be designed to compare different measurement instruments in different contexts and customer groups. Finally, the specific nature of the PESS places significant importance on the knowledge and effectiveness of the faculty members who deliver the services. In this regards, PESPERF may be seen as a broader measure since it does not include dimensions for a detailed measurement of faculty quality. The literature provides some evidence with respect to the role of faculty in the higher education (Feldman, 1984; Marsh, 1987; Marsh and Roche, 1993; Rowley, 1996; Pozo-Munoz *et al.*, 2000; Greimel-Fuhrmann and Geyer, 2003; Voss and Gruber, 2006; Van de Grift, 2007). Therefore, future studies should utilize alternative methods of incorporating such information into measuring service quality in the PESS environment.

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