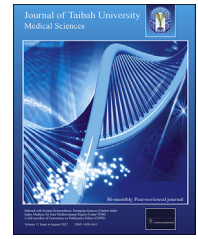Taibah University

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Original Article

Evaluating educational service quality among dentistry and nursing students with the SERVQUAL model: A cross-sectional study

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الملخص

أهداف البحث: هدفت هذه الدراسة إلى تقييم جودة الخدمات التعليمية باستخدام نموذج جودة الخدمة لدى طلاب طب الأسنان والتمريض. بالإضافة إلى ذلك، تمت دراسة آثار قطاعات التعليم والبلد والجنس والسنة الأكاديمية على جودة خدمات التعليم.

طرق البحث: تم تطبيق طرق العينات غير العشوائية على الطلاب المتاحين أثناء إجراء هذه الدراسة المقطعية لاختيار (528) طالب أسنان وتمريض في القطاعات الحكومية والخاصة من مصر والمملكة العربية السعودية. تم جمع البيانات باستخدام اثنين من الاستبانات ذاتية الإدارة. تضمنت الاستبانة الأولى الخصائص الديموغرافية للمشاركين، بينما جمعت الاستبانة الثانية بيانات حول جودة الخدمة التعليمية باستخدام أداة جودة الخدمة ذات الأبعاد الخمسة.

النتائج: بلغ متوسط الدرجة الإجمالية لجودة التعليم 3.65 وكان متوسط درجة الموثوقية هو الأعلى بين جميع أبعاد الجودة (3.79). كانت هناك علاقة خطية إيجابية ذات دلالة إحصائية بين جودة التعليم وكل نوع من أنواع القطاع التعليمي، ومجال الدراسة، والدولة، وكذلك العام الدراسي.

الاستنتاجات: كان تصور الطلاب لجودة الخدمات التعليمية أعلى من المتوسط. مجال الدراسة كان له الأثر الرئيسي الأكبر على جودة الخدمات التعليمية. بالإضافة إلى ذلك، أثرت السنة الدراسية والقطاعات التعليمية والبلد بشكل كبير على جودة الخدمات التعليمية.

الكلمات المفتاحية: طب الأسنان؛ الخدمات التعليمية؛ التمريض؛ الجودة

Abstract

Objectives: This study was aimed at evaluating the quality of educational services among dentistry and nursing students through use of the SERVQUAL model. Additionally, the effects of education sector, country, gender, and academic year on the quality of education services were studied.

Methods: A convenience sampling technique was used in this cross-sectional study to recruit 528 dentistry and nursing students in governmental and private sectors from Egypt and KSA. Data were collected through two self-administered questionnaires. The first questionnaire included participants' demographic characteristics, whereas the second questionnaire collected data on educational service quality by using the five-dimension SERVQUAL tool.

Results: The total mean score for quality of education was 3.65. The mean reliability score was highest among all quality dimensions (3.79). A significant positive linear association was observed between the quality of education and educational sector, field of study, country, and academic year.

Conclusion: Students' perceptions of educational service quality were above average. Field of study had the largest main effect on the quality of educational services. Additionally, academic year, educational sectors, and country significantly influenced the quality of educational services.

Keywords: Dentistry; Educational services; Nursing; Quality; SERVQUAL

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Introduction

Education service quality is an important area in the field of education. All educational institutions strive to achieve and maintain high standards of performance to be competitive in the higher education market. Ensuring the quality of education is important for the survival of academic institutions. Quality, therefore, is recognized as a strategic tool for achieving operational efficiency and better performance in businesses.[1] Providing services with reasonable quality is a highly demanding and stressful procedure, and persistent customer satisfaction is considered the greatest challenge for any organization.[2] Quality assessment of educational institutions has become a growing concept in the past two decades, because of the important economic, social, and cultural roles of these institutions in societal development.[3]

Education service quality has been defined according to compliance with set goals.[4] Peters and Waterman (1982)[5] have equated service quality with excellence, whereas Parasuraman et al. (1994)[6] have defined it as "the degree of discrepancy between customers' expectations and their perceptions of performance of a service organization." Expectation is defined as the customers' wants, and perception is defined as the consumers' evaluations of the actual provided services. In addition, Holdford and Patkar (2003)[7] have provided the definition of "an assessment of the services offered to the students in their educational journey."

Service quality assessment can be performed through technical and functional approaches. In technical assessment, quality can be rated according to the scientific standards of professionals or academics, whereas in the functional approach, the service can be evaluated from the customers' points of view.[8,9] Anderson (1995)[8] has noted that functional quality is the most evaluated aspect of service quality, and it has the most substantial effects on quality improvement.

Sahney et al. (2008)[10] have reported that students, staff, and faculty members are the major customers in academic institutions. Moreover, Sirvanci (2004)[11] has rated students as the most important customers in these organizations, because they receive many educational services, such as registration, course selection, and other related services. To improve the performance of any educational institution, quality monitoring of educational services should be performed, and students' views regarding the quality of provided services is essential for such monitoring.[12]

More than 20 models have been created to assess service quality, most of which measure the quality of services in the industry and market; however, few models assess educational services. Each model focuses on certain aspects of service quality. Ahmady et al. (2019)[13] have highlighted the importance of introducing an appropriate model for valid and reliable assessment in the field of education.

SERVQUAL is a well-established model for measuring service quality. Parasuraman et al. (1988)[14] developed the SERVQUAL model to measure the gap between customers' perceptions and expectations regarding provided service quality. This multidimensional model measures service quality through five dimensions. Rafati et al. (2021)[15] have provided a detailed explanation of SERVQUAL's dimensions, as follows:

> *Assurance (meaning the ability of the university to provide the correct and reliable services it promised), responsiveness (meaning helping students to provide services as soon as possible), reliability (meaning the existence of knowledge, politeness and humility and the ability to transfer trust and confidence to students by university staff and instructors), empathy (meaning the ability of university staff and instructors to provide distinctive and caring attention to students), and tangibility (meaning having the necessary physical facilities and equipment) dimensions.*

Several developments have been made in measuring service quality on the basis of customers' perceptions. In 1992, Cronin and Taylor[16] developed the service performance model SERVPERF, which was derived from the SERVAQUAL model and uses the same five dimensions, but relies on only students' perceptions and ignores their expectations. The SERVPERF model has been used by Oliver (1993)[17] and McAlexander et al. (1994),[18] who support measuring only customers' perceptions in evaluating service quality.

SERVQUAL is the most widely used measure to assess service quality in higher education. Zafiropoulos, (2006)[19] and Moosavi et al. (2019)[20] have conducted a comprehensive review and analysis of the quality of educational services according to students' perspectives in Iran. Their analysis of 18 research articles has revealed that the SERVQUAL model is the most effective model for evaluating and measuring service quality in the educational sector. The SERVQUAL model has several other advantages: it can be adapted according to the services provided and the type of organization; it has high validity and reliability in the measurement of clients' perceptions; and it aids in analyses based on differences in demographic, psychological, and other factors.

Service quality assessment is a major challenge for most service providers, because it varies broadly according to cultural differences, demographic characteristics, and personal factors.[21-23] Additionally, measuring customer satisfaction in an educational institution may be affected by the people involved, as well as their behavior and knowledge of service quality, among many other factors.[24,25] Gilavand, (2016)[26] has reported that students' views and evaluations of the services provided to them differ in many aspects from the views of faculty members. Therefore, to improve the educational services in colleges and universities, students' points of view should be respected to remove obstacles and achieve student satisfaction.

In summary, the impetus for the present research study came from several factors. First, few studies have measured service quality in higher education according to students' perceptions. Second, dentistry and nursing are important fields in the medical sciences, and enhancing the quality of the educational services provided in these health specialties

would result in higher satisfaction and performance rates among students. Several studies have been conducted to evaluate the quality of educational services in health science colleges in developed and developing countries.[27,3] However, few studies have been conducted on this topic in Arabic countries. The present study focused on filling the gap in research on the quality of education services, particularly in health science colleges of dentistry and nursing. Therefore, the study specifically aimed at evaluating the quality of educational services with the SERVQUAL model in dentistry and nursing students. To fulfil this aim, we compared perceptions regarding the quality of education services according to the field of study (dentistry versus nursing), and studied the effects of education sectors, country, gender, and academic year on participants' perceptions regarding the quality of education services.

Materials and Methods

Study design and population

This questionnaire based comparative cross-sectional study was conducted to assess the quality of the provided services in health science colleges (dentistry and nursing). A convenience sampling technique was used to recruit a total of 528 study participants. A total of 292 dental students and 236 nursing students from both private and governmental colleges participated in the study. Students from Egypt (232) and KSA (296) were recruited to participate.

The criteria for inclusion in the study were as follows: regular dental and nursing students from Egypt and KSA; students affiliated with either governmental or private sectors; and second to fourth year nursing students, second to fifth year dental students, or interns in both fields of study.

Instruments

Data were collected with two self-administered questionnaires. The first questionnaire collected data on gender, country, educational sector, field of study, and academic year. Data on education service quality were collected with the SERVQUAL instrument proposed by Parasuraman et al.[28,14,29] SERVQUAL is an easy-to-use, multidimensional, comprehensive instrument, which was applied to identify the strengths and weaknesses of education service quality.[30]

The questionnaire consisted of 25 items constituting five dimensions (tangibles, responsiveness, reliability, empathy, and assurance). For measurement of student satisfaction, participants scored each of the items on a 5-point Likert scale, in which 5 represented strong agreement, and 1 represented strong disagreement. The students were asked to rate the perceived quality of the provided educational services in their colleges according to actual situations.

Parasuraman et al. (1988, 1991)[28,29] have described SERVQUAL as a concise multiple−item scale with very good reliability and validity. The validity of the scale has been further supported in Bahadori et al. (2011)[27] by a group of experts in the field of educational quality. The authors reported Cronbach's alpha coefficient ranging between 0.91 and 0.87 for the five SERVQUAL dimensions, thus supporting the high reliability.

Data collection method

The study proposal was submitted to the Ethical Committee of Vision Colleges Riyadh, KSA. Study participants were informed about the aim and specific objectives of the research, and the value of their participation for service quality improvement at their colleges. Furthermore, they were informed that their participation was only on a voluntary basis and that they had the right to withdraw at any time without any penalty. In addition, they were informed that their identity would be kept fully anonymous and confidential, and they would not be required to provide their names, academic identification numbers, or any personal identification. Participants' responses were accessed by only the research investigators, and data were handled in aggregate rather than as individual scores.

Data were collected through a well-structured self-administered questionnaire created in Microsoft Forms (Office 365) (https://forms.office.com/Pages/ResponsePage.aspx?id=LkmLQdIAokWmefdtZLpbgo3mE0Dt8D5BpaQm6bgwa8tUNVVOSTEwUE9HNjIwS0NKN0NTU1BOUUpHQy4u). The starting date for sharing the questionnaire link was September 1, 2021 and the link was available to the participants until October 31, 2021. The students were notified about the questionnaire through email and WhatsApp messages at the beginning of the sharing period. Gentle frequent reminders were sent to potential participants to increase the response rate.

Statistical analysis

The Microsoft Forms data were downloaded as a Microsoft Excel sheet and analyzed in Statistical Package for Social Science (IBM SPSS) version 20. The data analysis included descriptive statistics to summarize information obtained from study participants (means, standard deviations, frequencies, and percentages) and inferential statistics to compare variations in responses among nursing and dental students from both fields of study with independent t-tests and one way ANOVA. In addition, multivariate analysis was conducted to assess the nature of the associations among study variables. Pearson correlation and regression analysis were performed to investigate factors influencing the quality of educational services among study participants. The significance level was set at $p < 0.05$.

Results

A total of 528 students out of 798 contacted actively participated in the present study. The response rate was 66.2%, and 57.6% (n = 304) were women. Most participants (56.1%) were from KSA. Dentistry students constituted almost 55.3%, and nursing students constituted almost 44%. The participation in the private and governmental sectors was nearly equal (51.5% and 48.5%, respectively). One-quarter of the sample comprised second-year students, and

Table 1: Distribution of demographic characteristics among study participants (N = 528).

Variable		Total	Percentage
Gender	Female	304	57.6
	Male	224	42.4
Country	Egypt	232	43.9
	Saudi	296	56.1
Field of Study	Dentistry	292	55.3
	Nursing	236	44.7
Education Sector	Governmental	256	48.5
	Private	272	51.5
Academic Years	Second	132	25.0
	Third	64	12.1
	Fourth	108	20.5
	Fifth	106	20.1
	Intern	118	22.3

the lowest participation was among third-year students (12.1%; Table 1).

Table 2 shows the mean distributions of the different items in the dimensions of educational quality. For tangibles, among the five items, staff appearance had the highest mean score (3.96), and similar results were found among nursing students (4.05), Saudi students (3.97), and students in private colleges (4.07). Providing required information to learners had the highest mean score in the responsiveness dimension (3.71), particularly among nursing students (4.03), Saudi students (3.80), and students in private colleges (3.85). For reliability of education, having the knowledge necessary to perform educational services consistently ranked highest (3.89), particularly among nursing students (4.13), Saudi students (3.93), and students in private colleges (3.95). For the empathy dimension, the highest mean was observed for responding to students patiently (3.72), which was similarly rated among nursing students (3.93), Saudi students (3.82), and students in private colleges (3.83). Finally, for the assurance dimension, keeping promises had the highest mean among all items (3.56). This finding was consistently observed among nursing students (3.81), Saudi students (3.63), and students in private colleges (3.71).

The total mean score for quality of education was 3.65 out of 5. The mean reliability score was highest among all quality

Table 2: Average scores of perceived educational service quality according to field of study, country, and education sector.

Quality Dimensions		Total Average	Field of Study		Country		Education Sector	
			Dentistry	Nursing	Egypt	KSA	Government	Private
			Average	Average	Average	Average	Average	Average
Tangibles	Educational equipment	3.55	3.30	3.87	3.42	3.66	3.36	3.74
	Educational facilities	3.70	3.40	4.08	3.59	3.79	3.47	3.92
	Staff appearance	3.96	3.88	4.05	3.93	3.97	3.84	4.07
	Facilities needed	3.69	3.51	3.92	3.56	3.80	3.48	3.90
	Intimate and dynamic relationship with learners	3.74	3.58	3.94	3.64	3.82	3.54	3.93
Responsiveness	Interest in solving learners' problems	3.46	3.15	3.84	3.38	3.52	3.38	3.53
	Willingness to help learners	3.67	3.44	3.96	3.63	3.70	3.56	3.77
	Provision of required information to learners	3.71	3.45	4.03	3.59	3.80	3.56	3.85
	Preparedness for responding	3.66	3.43	3.94	3.47	3.80	3.49	3.81
	Convenient working hours	3.69	3.49	3.94	3.55	3.80	3.59	3.79
Reliability	Provision of safe and reliable service	3.69	3.45	3.98	3.60	3.75	3.60	3.77
	Sufficient knowledge to respond to learners	3.79	3.57	4.06	3.81	3.77	3.77	3.81
	Knowledge, skills, and abilities	3.83	3.58	4.13	3.85	3.81	3.83	3.82
	Knowledge necessary to provide education services	3.89	3.71	4.13	3.85	3.93	3.84	3.95
	Reliable behavior	3.77	3.56	4.03	3.58	3.91	3.59	3.93
Empathy	Creation of a peaceful environment	3.53	3.23	3.90	3.51	3.55	3.56	3.51
	Personal attention to students	3.44	3.19	3.75	3.13	3.68	3.23	3.63
	Respect for learners' feedback	3.62	3.31	4.01	3.36	3.82	3.46	3.77
	Students with interest in hearing comments	3.65	3.42	3.93	3.44	3.81	3.48	3.80
	Patient response to students	3.72	3.54	3.93	3.58	3.82	3.59	3.83
Assurance	Keeping promises	3.56	3.36	3.81	3.48	3.63	3.41	3.71
	Provision of services without mistakes and errors	3.42	3.19	3.70	3.30	3.51	3.22	3.60
	Equal treatment of all learners	3.50	3.27	3.78	3.45	3.53	3.39	3.60
	Service provision at the determined times	3.51	3.31	3.75	3.43	3.57	3.37	3.64
	Speed in operation	3.53	3.25	3.88	3.37	3.66	3.42	3.64

Table 3: Mean distribution of quality of education among study participants.

Quality Dimensions	Mean	Standard Deviation
Tangibles	3.73	0.78
Responsiveness	3.64	0.90
Reliability	3.79	0.87
Empathy	3.59	0.93
Assurance	3.50	0.92
Total Quality of Education	3.65	0.80

dimensions (3.79) and was followed by tangible dimensions (3.73). The lowest mean score was for the assurance dimension (3.50; Table 3).

Gender did not show any statistically significant differences in any studied dimensions of the quality of educational services. In contrast, country showed a significant effect on the rating of the following dimensions: tangibles, responsiveness, empathy, and assurance ($p = 0.008$, 0.009, <0.001 and 0.03, respectively). Saudi students gave higher ratings than Egyptian students to the different studied dimensions. The results for the educational sector showed significant differences between the governmental and private sectors in all dimensions except reliability, and the private sector results were higher. For field of study, the nursing students rated the different quality dimensions significantly more highly than the dentistry students ($p < 0.001$). For academic year, the second-year students provided the highest scores throughout the different quality dimensions. Regarding the effects of background variables on mean total education service quality, country, educational sector, field of study, and academic year had significant effects (0.005, <0.001, <0.001,

0.001, respectively). Gender did not show any significant effect (Table 4).

Further analysis of the total quality of educational services for each academic year according to field of study from the second to fourth years, as well as for interns, is shown in Table 5. Nursing students reported significantly higher scores for quality of education for all academic years, except for internship. Both dentistry and nursing interns rated the quality of educational services similarly.

Correlation and linear regression analyses were conducted to examine the relationship between the quality of educational services and the proposed predictors (Tables 6 and 7). Table 6 summarizes the linear regression analysis between the dependent variable and the potential proposed predictors. A statistically significant positive linear correlation was observed between quality of education and each educational sector, field of study, and country ($p < 0.001$), thus indicating that higher scores for these variables tended to reflect higher quality of education. In contrast, gender was not significantly associated with educational services.

The linear regression model with all three predictors yielded an $R^2 = 0.13$, $F (3, 524) = 26.68$, $p < 0.001$. As shown in Table 7, the predictors of country, education sector and field of study each had significant positive regression weights, thus indicating that students with higher ratings on these scales were expected to have higher ratings of educational service quality, after controlling for the other variables in the model. The results for country, coded as $1 = $ Egypt and $2 = $ KSA, indicated that KSA had higher ratings in the quality of educational services. The educational sector results, coded as $1 = $ governmental and $2 = $ private, indicated that the private sector had better

Table 4: Relationships between the five quality dimensions and participants' gender, country, educational sector, and field of study.

Quality Dimensions		Tangibles	Responsiveness	Reliability	Empathy	Assurance	Total Quality
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Gender	Female	3.76 (0.77)	3.66 (0.86)	3.81 (0.85)	3.57 (0.92)	3.51 (0.88)	3.66 (0.78)
	Male	3.69 (0.80)	3.61 (0.94)	3.77 (0.90)	3.61 (0.96)	3.50 (0.98)	3.64 (0.83)
	t-test	−0.95	−0.70	−0.58	−0.51	−0.16	−0.39
	p-value	(0.34)	(0.49)	(0.56)	(0.61)	(0.88)	(0.70)
Country	Egyptian	3.63 (0.80)	3.52 (0.88)	3.74 (0.88)	3.40 (0.92)	3.41 (0.83)	3.54 (0.76)
	Saudi	3.81 (0.76)	3.73 (0.90)	3.84 (0.86)	3.74 (0.92)	3.58 (0.99)	3.74 (0.82)
	t-test	−2.65	−2.62	−1.29	−4.12	−2.14	−2.85
	p-value	(0.008)	(0.009)	(0.20)	(<0.001)	(0.03)	(0.005)
Educational Sector	Government	3.54 (0.84)	3.52 (0.92)	3.72 (0.88)	3.46 (0.93)	3.36 (0.88)	3.52 (0.80)
	Private	3.91 (0.68)	3.75 (0.86)	3.86 (0.86)	3.71 (0.93)	3.64 (0.95)	3.77 (0.78)
	t-test	−5.65	−2.97	−1.75	−3.03	−3.54	−3.67
	p-value	(<0.001)	(0.003)	(0.08)	(0.003)	(<0.001)	(<0.001)
Field of Study	Dentistry	3.53 (0.83)	3.39 (0.97)	3.57 (0.93)	3.34 (1.00)	3.28 (0.99)	3.42 (0.86)
	Nursing	3.97 (0.64)	3.94 (0.68)	4.06 (0.70)	3.90 (0.73)	3.79 (0.72)	3.93 (0.62)
	t-test	−6.71	−7.39	−6.72	−7.26	−6.58	−7.73
	p-value	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
Academic Year	Second	3.88 (0.73)	3.75 (0.77)	4.06 (0.71)	3.73 (0.74)	3.59 (0.66)	3.80 (0.63)
	Third	3.54 (0.84)	3.56 (0.92)	3.56 (0.89)	3.34 (0.94)	3.31 (0.95)	3.46 (0.83)
	Fourth	3.46 (0.84)	3.51 (0.93)	3.61 (0.86)	3.33 (0.95)	3.30 (0.91)	3.44 (0.81)
	Intern	3.73 (0.65)	3.50 (0.88)	3.66 (0.93)	3.51 (0.98)	3.43 (1.02)	3.56 (0.80)
	F	6.86	2.31	8.55	4.80	2.73	5.47
	p-value	(<0.001)	(0.08)	(<0.001)	(0.003)	(0.04)	(0.001)

Fifth year results were not included in the one way ANOVA because nursing is a 4-year program.

Table 5: Association of the total quality of educational services in each field of study according to academic year.

Academic Year	Field of Study	Mean	Standard Deviation	t-test	p-value
Second	Dentistry	3.59	0.83	−3.32	0.001
	Nursing	3.95	0.39		
Third	Dentistry	3.13	0.69	−5.92	<0.001
	Nursing	4.20	0.63		
Fourth	Dentistry	3.09	0.94	−4.82	<0.001
	Nursing	3.77	0.48		
Intern	Dentistry	3.54	0.85	−0.66	0.510
	Nursing	3.66	0.56		

**Fifth year results were not included because nursing is a 4-year program.

Table 6: Correlation between quality of educational services and study variables.

Variables	Pearson Correlation (r)	p-value
Gender	0.02	0.699
Educational Sector	0.16	<0.001
Field of Study	0.32	<0.001
Country	0.12	0.005
Academic Year	−0.11	0.03

Table 7: Linear regression analysis of service quality predictors.

Predictors	Unstandardized Coefficients		Standardized Coefficients	T	p-value
	B	Std. Error	Beta		
Country	0.18	0.09	0.11	2.11	0.036
Educational Sector	0.34	0.08	0.21	4.27	<0.001
Field of Study	0.57	0.07	0.35	7.99	<0.001

perception regarding the quality of educational services. Moreover, the results for field of study, coded as 1 = dentistry and 2 = nursing, showed that nursing students had better educational quality than dentistry students. Finally field of study, followed by educational sector, had the greatest main effect on the dependent variable of education quality (beta = 0.35, and 0.21, respectively).

Disscusion

The quality of provided educational services is the cornerstone of learners' satisfaction; achieving higher quality ensures better outcomes. Educational institutions recognize that their continued existence depends on the value of their services, and education quality distinguishes universities from one another.[31,32] Evaluating educational services is therefore mandatory for continual improvement. Measurement of the quality of educational services relies on the precise estimation of student satisfaction and performance. Student performance can be evaluated through various assessment methods, such as practical,

clinical, and theoretical examinations, However, students' satisfaction and attitudes toward the provided services is considered difficult to accurately and reliably measure. An accurate measurement model for education service quality is therefore required to ensure that students are provided with the best possible teaching and learning experiences to achieve the desired program learning outcomes. The SERVQUAL model, according to an extensive literature review conducted by Khattab (2018),[33] is considered the most convenient model to assess service quality in higher education. However, research assessing the effectiveness of this model in dental and nursing education is scarce, specifically in Arab regions. In the absence of sufficient studies in the Arab higher education context, the aim of this study was to evaluate the quality of educational services provided in health science colleges by using the SERVQUAL model to assess the responses of dentistry and nursing students.

Students' perceptions of the quality of educational services

Among 528 dental and nursing students, the perception of education service quality was relatively moderate, with a total mean score for quality of 3.65/5. This result is in fact higher than those reported by Afridi et al. (2016),[34] who have conducted a study to analyze and quantify service quality in private sector higher education universities and institutions in Peshawar, Pakistan. In that study, the mean perceived quality score among study participants was 3.37; additionally, the authors have observed that the SERVQUAL model allows institutions to identify gaps in their services provision framework, which can be observed among the consumers (students) and producers (universities staff, faculty members, and structural facilities). Similarly, Asefi et al. (2017)[35] have reported a mean value for the perception of quality of educational services above average among nursing students (3.56).

The mean reliability score for the present study was highest among all quality dimensions (3.79), followed by tangible dimensions (3.73). However, in Rizvi et al. (2020),[2] responsiveness has been reported as the most important dimension, followed by tangibility. Misaii et al. (2019)[36] have stated that the reliability of a high value indicates satisfaction with the timely performance of activities by professors and staff. The content items for assessment of reliability included providing safe and reliable service; having sufficient knowledge, skills, and abilities to respond to learners; and showing reliable behavior. Further analysis of the studied dimensions revealed that having the knowledge, skills, and abilities necessary to perform educational services had the highest mean value in the reliability dimension, whereas staff appearance ranked highest in the tangible dimension, whereas educational equipment was unexpectedly the lowest ranked item in the same dimension.

Kouchaki and Motagh (2017)[37] have studied the gap between students' perceived and expected educational service quality. Their study has indicated a minimal gap in the tangibility dimension and demonstrated that 89% of participants recognized a negative gap for educational service quality in terms of total service quality; therefore,

the quality of provided educational services in the study was low. Asefi et al. (2017)[35] have identified that a lower gap between the expectations of students and perception of education services represents the high quality of educational services provided.

The current findings are also consistent with those from Akhlaghi et al. (2012),[38] in a study conducted in a technical and vocational college in Iran. That study has identified quality gaps in all service quality dimensions; the largest gap was for the responsiveness dimension, and the smallest gap was for reliability, thus indicating that reliability met the participants' expectations. Similarly, Aghamolaei, and Zare, (2008)[39] have observed the lowest and the most negative quality gap in the reliability and responsiveness dimensions, respectively. Moreover, as shown by Gholami et al. (2014),[40] the greatest and the least negative gap percentages were found in the empathy dimension and reliability dimension, respectively. Bahadori et al. (2013)[41] have further reported that the responsiveness dimension showed the largest gap, whereas the smallest gap was associated with the reliability dimension. Furthermore, all survey items showed a negative gap, indicating that the students' expectations were not met in any items in that educational system.

In contrast to the current findings, Asefi et al. (2017)[35] have reported lower assurance gaps and the greatest perceived quality gap for tangibles. In the current study, the ability to keep promises to students, as well as physical facilities (including buildings, classrooms, and equipment used by teachers) had far greater attractiveness than reported by Asefi et al. (2017).[35] Similarly, Misaii et al. (2019)[36] have reported a negative gap in all model dimensions, and found that the empathy and tangible dimensions had the largest gap values, whereas responsiveness had the smallest gap value. Additionally, Rafati et al. (2021)[15] have reported the highest quality gap of educational services in the empathy dimension, followed by the reliability, responsiveness, and assurance dimensions, and the lowest gap in the tangibility dimension.

In the current study, the lowest mean score was for the assurance dimension (3.50). The assurance dimension included keeping promises; providing services without mistakes and errors; treating all learners equally; providing services at the determined times; and speed in operation. The highest mean score was associated with keeping promises, whereas providing services without mistakes and errors was the lowest ranked item. Misaii et al. (2019)[36] have suggested that lower satisfaction in the assurance dimension is attributable to problems in facility discussions between professors and students; sufficiency of resources; and the ability to inspire trust and confidence in increasing students' knowledge.

Factors influencing the quality of educational services

Correlation and linear regression analyses examining the relationship between the quality of educational services and various proposed predictors revealed a statistically significant positive linear correlation between the quality of education and each field of study, educational sector, and country.

Field of study and quality of educational services

Nursing students rated the different quality dimensions significantly higher than dentistry students. This finding was consistently supported by the results of the regression analysis, which indicated that field of study had the largest main effect on educational quality, as compared with educational sector and country. Moosavi et al. (2019)[20] have reported that the differences in the perception of education service quality are attributable to variations in the nature of education; the diversity of facilities; the type of staff and faculty; education level; and students' background characteristics in different courses.

Our current findings were consistent with those of Farzianpour et al.,[42] who have reported lower quality for dental schools than the other evaluated schools. They have also reported educational goals, missions, research facilities, and spaces as the weakest areas to be considered and improved. In addition, Moosavi et al. (2019)[20] have examined the quality of the educational services of nursing students and observed an inverse association between satisfaction and the provided services and field of the study. This gap indicates that the delivery of educational services has not met the anticipated standards.

In contrast, Gholami et al. (2014),[40] in a study at the Neyshabur Faculty of Medical Sciences, have reported no significant differences in students' perceptions and expectations in the nursing, anesthesia, and surgery fields; however, significant differences were observed among students in different educational years in terms of some perceptions and expectations. Similarly, Rafati et al. (2021)[15] have shown that the gap between the quality of educational services and its domains does not differ in terms of the demographic variables of gender and field of study.

Asefi et al. (2017),[35] in a cross-sectional study of a random sample of 320 nursing students, have examined assurance, responsiveness, empathy, tangibles, and confidence with a SERVQUAL questionnaire. They have reported a quality of educational services lower than that observed in the present study. The investigators have found a negative gap between students' expectations and perceptions regarding the quality of educational services delivered, with mean scores of 4.34 ± 0.63 for students' expectations and 3.56 ± 0.68 for their perceptions regarding the educational services delivered. The lowest observed gap of quality was for assurance, followed by reliability, whereas the largest gap was for tangibles. In addition, Bahadori et al. (2013)[41] have reported that students in different disciplines have significantly different gap perception in the tangibles dimension.

Further item analysis with the current model revealed that nursing students had higher ratings than dentistry students for the items with the highest quality ratings throughout the five quality dimensions. Nursing students highly rated staff appearance (in the tangible dimension), providing required information to learners (in the responsiveness dimension), having the knowledge necessary to provide educational services (in reliability of education), responding the students patiently (in the empathy dimension), and keeping promises (in the assurance dimension), which had the highest mean, particularly among dentistry students. Interestingly, these

same results were consistently observed for students in the private sector and students from KSA.

Educational sector and quality of educational services

The educational sector results showed significant effects in all SEQUAVEL dimensions except reliability, and the private sector had the highest effects. Asefi et al. (2017)[35] have reported that, among the factors influencing the perception of education quality in various educational institutions, the difference in students' attitudes is associated with various equipment and training spaces; differences in the numbers of students and faculty members; background experiences; professional qualifications; scientific levels and competencies of teaching staff; and the nature and types of training courses. Furthermore, the highest quality perception was associated with tangible and reliability dimensions among students in the private sector. The results of this study are mostly consistent with those from other studies. Leonnard (2018)[43] has shown that the main factors influencing student satisfaction in private universities are the tangibles and reliability dimensions. In contrast, Afridi et al. (2016)[34] have reported that the gap between expectations and perceptions is very high for responsiveness (-1.11), whereas assurance has the smallest gap (- 0.75).

According to Rizvi et al. (2020),[2] in a study on public sector universities in Karachi, students usually have higher expectations and trust in the organizational policies of private universities than public universities, because the latter lack the necessary advanced infrastructure to meet emergent needs. Therefore, their research findings showed the greatest gap in tangibility. The authors further identified the highest gap for responsiveness, thus indicating that staff members and faculty members in public universities are less responsive to students' needs and concerns. Rizvi et al. (2020)[2] have reported a difference between perceptions and expectations of reliability; however, the results were not as significant as those for tangibility and responsiveness. In agreement with this finding, Abari et al. (2011)[44] have reported a significant difference between students' expectations and the quality of services in the responsiveness dimension. The authors' findings ranked the other dimensions as follows in descending order: empathy, assurance, tangibility, and confidence in service quality responsiveness.

Country and quality of educational services

The study findings regarding country influence revealed a significant effect on the ratings of the following dimensions: tangibles, responsiveness, empathy, and assurance. Saudi students showed higher ratings than Egyptian students for the different studied dimensions. Al-Shehri (2012)[45] has identified several intrinsic and extrinsic factors, including motivational, cultural, and organizational factors, which together influence the structure, processes, and outcomes of medical education in various institutions and different countries. Al-Shehri (2012)[45] has noted that KSA has witnessed unprecedented expansion and a massive increase in the quantity of medical education.

Moreover, Gilavand and Maraghi (2019)[46] have shown that a gap exists in all subscales of the SERVQUAL model, and students' expectations exceed their perceptions of the existing situation. Gilavand and Maraghi (2019)[46] have contended that health sciences education systems in various countries have experienced numerous transformations as a result of global development, advances in information technology, and the spread of new diseases, which have affected their operational processes as well as their goals.

Ahmady et al. (2019)[13] have further reported that higher education appraisals at the international level rely on the local culture and societal structure. These authors therefore have recommended evaluation of the quality of educational services on the basis of scientific models rather than only student satisfaction. Rafati et al. (2021)[15] have noted that the differences in the quality of educational services across universities may be due to the different levels of study; the number of students, academic professionals, and staff; the personality traits of individuals; and the cultural spaces of the studied populations.

Academic year and quality of educational services

Academic year was significantly correlated with the quality of educational services. Students in their second year showed the highest perception of educational quality, whereas fourth year students showed the lowest quality perception. Similarly, Anderson (1995)[8] has emphasized that lower student expectations are associated with longer enrollment times. Additionally, the current study findings regarding the total quality of educational services according to academic year and field of education showed that nursing students had significantly higher scores for quality of education for all academic years, except for internship. Gholami et al. (2014)[40] have found that students in their fourth year of education, compared with other years of study, have the highest expectations regarding educational service quality. In addition, the negative quality gap in all dimensions (except tangibles) was greater in students in their fourth year of education than the other years, thus indicating that these students have the lowest quality perception. In comparison, Soltani et al. (2018)[47] have reported that the satisfaction level of fourth year students with education in different dentistry school sections was significantly higher than that of fifth and sixth year students.

Gender and quality of educational services

Gender was not significantly associated with educational services. The current study revealed no significant difference between men and women regarding all dimensions of quality. These findings confirmed the results of Gholami et al. (2014),[40] who have found no significant difference in the mean of the quality gap between male and female students. This finding is also consistent with those from Alijanzadeh et al. (2018),[48] who did not find a significant relationship between students' perceptions of education quality and gender. Furthermore, Moosavi et al. (2019)[20] have reported that the variables of gender and academic background

have no significant effects on the mean service gap in each of the five aspects of educational services.

In contrast, Yousapronpaiboon (2014)[49] and Shams et al. (2014)[50] have reported a significant relationship between educational service quality and gender. Bahadori et al. (2013)[41] have reported no significant difference in the total gap across various demographic groups; however, female students showed a significantly wider gap for the tangibles dimension than male students. Furthermore, Kouchaki and Motagh (2017)[37] have shown no significant difference between genders regarding the tangible dimension, in agreement with the current results.

Study limitations

Two limitations might have been identified in the current study. First is the technique of study sample recruitment that was based on a convenience technique, a matter which might have influenced the generalizability of the present study findings. Second, the assessment of education quality that was performed using a self-reported method, might have been affected by desirability and response bias.

Conclusion

On the basis of the study findings, we conclude that the students' perception of quality of educational services was above average. Reliability, followed by tangibles, was the highest rated dimension, whereas assurance was the lowest rated dimension. Among background variables, field of study had the highest main effect on the quality of educational services. Additionally, academic year, educational sectors, and country significantly influenced the quality of educational services.

Recommendations

Understanding the quality of education and the complexity of the evaluation process is an essential step toward developing and implementing appropriate actions. The SERVQUAL method is recognized as an influential tool to examine the quality of education services in different fields of science and has been recommended to be incorporated into the quality appraisal battery of scales used in higher education institutions. Moreover, quality perception among students can be improved by reinforcing staff capabilities through continuous training opportunities and open communication with students, to encourage students to share ideas for education planning and reform. Finally, this research should be replicated to examine the changes in students' expectations and perceptions and identify new needs and trends through the use of random sampling techniques.

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Conflict of interest

The authors have no conflicts of interest to declare.

Ethical approval

Ethical approval was obtained from the Research and Ethics Committee (IRB; Vision Colleges Riyadh, KSA/ visi.dent-2021021/3 August, 2021).

Authors contributions

RMA and HMMB conceived and designed the study; conducted research; provided research materials; and collected, organized, analyzed, and interpreted data. Both authors wrote the initial and final drafts of the article; have critically reviewed and approved the final draft; and are responsible for the content and similarity index of the manuscript.

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