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Online Training and Managing Service Quality with the Challenges of COVID-19: The Case of Private Institutes in the Jazan Region, Saudi Arabia

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Abstract: This study explores how private institutes in the Jazan Region of Saudi Arabia managed service quality of online training during the COVID-19 pandemic. The study, conducted using semi-structured interviews with key personnel from four institutes, found that online training was critical during the pandemic. However, the study identified challenges associated with online training, including in technology, communication, and students' motivation . The study recommends effective planning, communication, and technology infrastructure to support online training and deliver high-quality service. The findings contribute to the literature on the impact of COVID-19 on service quality and highlight the potential of online training as an educational tool in the face of challenges.

Keywords: heterogeneous resources, firefly algorithm, task scheduling, cloud computing.

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1 Introduction

Due to the importance and effectiveness of electronic training (e-training) in all fields, private training establishments have created an integrated e-training environment based on modern technologies for trainees, trainers, and the community. These include computers, internet networks, training software, forums, and email. In the past, training courses were held at institutes, but with the technological advancements, providing training remotely without the trainer meeting with the trainees is now possible. Developments in information and communication technology have brought about a paradigm shift or global transformation that has affected all training processes, particularly training methods. These transformations have led to modern mechanisms for acquiring knowledge and skills, transferring them, and strategies for generating them. It has become easier to use and adapt information and communication technology to reduce social and cultural disparities and overcome time-and-space constraints and human resource scarcity of human resources.

E-training is a process by which an interactive environment rich in computer-based applications, networks, and multimedia enables the trainee to achieve the objectives of the training process in the shortest possible time, with minimal effort, and with the highest quality without limitations of space and time.

2 Differences between Electronic Training and Electronic Education

There is no difference between e-training and electronic education as far as the training environment is concerned. Both require the essential components of any e-training system, such as the virtual classroom and the entry and registration system. At the same time, the difference is reflected in the training mechanism as electronic learning (e-learning) is linked to the name of an educational establishment (school or university) with teachers, students, quarterly tests, special attendance, and other school-related elements. Teachers must follow up on their students' activities during the semester through the electronic learning management system by allotting duties, answering queries, and interacting directly with them through educational activities such as chat forums and wikis.

On the other hand, e-training is used to train a group of people not belonging to an educational facility, such as employees of government agencies, administrative institutions, banks, and non-profit organizations. Electronic training

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involves self-training and control. Trainees have access to all the course content, but no trainers follow their activities or compel them to solve all the questions and skill tests and go through all the activities within the course. However, the management system for training activities (sequence activities) allocates a training course presentation mechanism and crossing or pass points for each subject, i.e., the trainee can only move to the next topic or activity if they have finished the previous one. Moreover, the system can establish conditions for passing the stage, e.g., setting a passing grade of 60% or more.

3 Literature Review

The concepts applied in e-training aim to control the entry and attendance of trainees and enable them to pass the exams without the intervention of any managers or trainers. All these tasks are incorporated into the training management system. More than 50 trainers would typically be required to follow 5,000 trainees. In e-training, all activities are done automatically until the e-certificateis generated (certificate of attendance or certificate of passing). The electronic training team at the Smart Style Institutes is now developing these technologies through MOODLE to be the first electronic training service at this sophistication level in the world.

The Gronroos Model (Gronroos C., 1988)

This model describes the quality of the technical/functional service (the what and how). It is a mixture of coupons and identifies what the service beneficiary took and how the service was delivered to them. This model focuses on "how" until success is achieved. Figure 1 is adapted from the Gronroos model (1988).

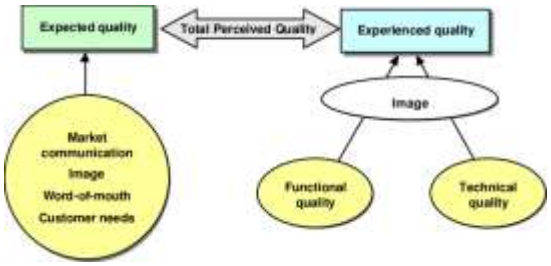

Fig. 1: A Model Conceptualized From the Gronroos Model (1988).

4 The Gaps Model (Oliver R. L., 1980; Parasuraman A. Z., 1985)

Based on this model, evaluations for service customers are based on expectations and perceptions on which the quality of service is determined. Differences in perceptions and expectations are linked to the level of service provided. If the perceived quality is lower than expected, the gap may be positive or negative. This model consists of five significant gaps in satisfaction that businesses have to fill to satisfy the customer.

These gaps include:

1. **The knowledge gap** is the difference between what was delivered and what was expected by customers.
2. **The policy gap** is the difference between translating an understanding of service delivery policies and procedures and managers' understanding of client needs
3. **The gap in delivery** is the difference between actual service delivery and service delivery policies.
4. **The communication gap** is the difference between what the company promised customers and what customers received.
5. **The customer gap** is the difference between what was delivered and expected by customers and their perceptions. The customer gap can be bridged by closing the remaining four gaps. Expectations and perceptions of the client can be aligned when the five gaps are filled.

5 Quality of E-Training Services

According to Gronroos (1978), service quality consists of three aspects with seven precise requirements. These include the results aspect (professional competence and capability), the procedural aspect (behavior and attitudes, flexibility and consistency of accessibility and trust, customer services and assistance), and aspects of the image (credibility and reputation). According to Suprihadi et al. (2020), service quality comprises two components: operational performance and technical skill. The level of customer satisfaction is greatly influenced by the technical excellence of the product and its perceived performance.

A person's level of satisfaction reflects their perception of the product's performance concerning their expectations for the item. The customer's level of dissatisfaction increases if the performance falls short of expectations. Customers report feeling happy when something lives up to their expectations. The consumer will also be satisfied if the performance exceeds their expectations (Kotler & Keller, 2012). A service quality model called ServQual was created by Parasuraman et al. (2002). It has five variables: trust, tangible assets, compassion, reliability, and interaction.

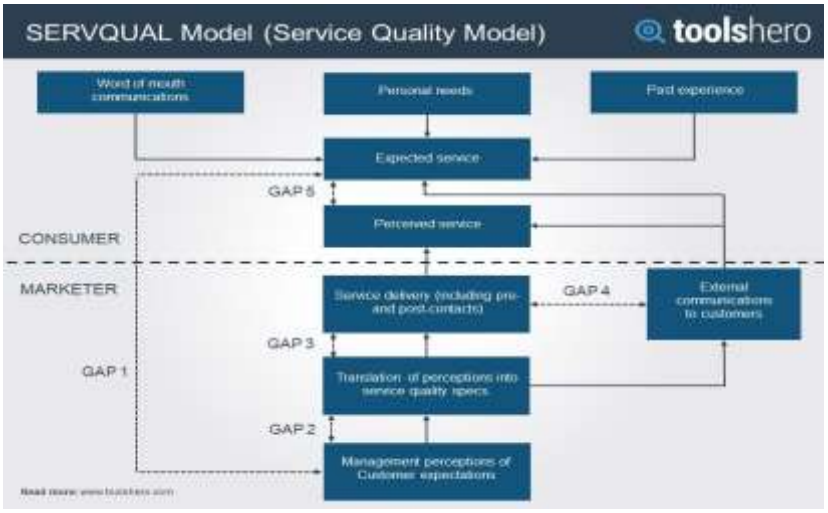

Fig. 2: The Gap Theory of Service Quality (Parasuraman et al., 1985).

6 The SERVAQUAL Model

SERVQUAL is a widely used model for evaluating service quality, initially developed by Parasuraman, Zeithaml, and Berry in 1985. The model is based on the gap theory of service quality. It suggests that customers evaluate service quality based on the difference between their expectations and their perceptions of the actual service received. The SERVQUAL model has been widely used in various service industries, including healthcare, banking, hospitality, and education. However, the model has also been criticized for its limitations, such as the assumption that customers clearly understand their expectations and the difficulty of defining service quality attributes.
In conclusion, SERVQUAL is a valuable model for evaluating service quality, particularly in service industries where customer satisfaction is critical. However, the model should be used with other methods to ensure a comprehensive service quality evaluation.

7 Methodology

A questionnaire comprising 22 item statements was designed to assess online learning service quality in private institutes in the Jazan region. These items represented the five service quality dimensions in the SERVPERF model. For each item, the student (the customer) was asked to express their feelings about the importance of each item in their decision regarding online learning and the quality they perceived of the service provided. Two general opinion questions about future interest behavior and satisfaction were added at the end of the questionnaire. The item statements used to measure the performance and importance of online service quality in private institutes in the Jazan region are shown in Table 1.
The modified SERVPERF (weighted SERVPERF) was used as follows: the importance of each item statement was collected from the questionnaire to do an importance-performance analysis (IPA). Service quality (SQ) was calculated by multiplying the weights by the perception score, as shown in Equation (1):

$$SQi = \Sigma\ k\ j=1 Wi\ j \cdot Pi\ j \quad (1)$$

Where: SQi = the service quality of individual "i." Pi j = the perception score of the item statement "j" for an individual "i." Wi j = the weighting factor of item statement "j" for an individual "i." The weighting factors were the normalized importance scores calculated from Equation (2):

$$Wi\ j = Ii\ j - Min\ Max - Min \quad (2)$$

Where: Ii j = the importance of item statement "j" for an individual "i" taken from the questionnaire. Min and Max are the minimum and the maximum importance scores for item statement "j."

The 22 item statements in Table 1 were then used to compare the importance and performance of the relevant University of Business and Technology (UBT) online learning services. It is a two-dimensional graph in which the vertical axis represents the importance of the chosen feature, and the horizontal axis represents how successfully private institutes in the Jazan region delivered the service. The two-dimensional graph is categorized into four quadrants. The first quadrant, "concentrate here," in the northwest corner, has the statements that should be the management's priority due to their high importance and poor performance scores. The second quadrant, "keep up the good work," indicates that the importance and performance were high and that the management should maintain this. The third one was placed in the quadrant named "low priority," in the southwest corner since they were rated down in importance and performance. The last quadrant is "possibly overkill," as there are unnecessary features that the management must address due to their low importance but high-performance score.

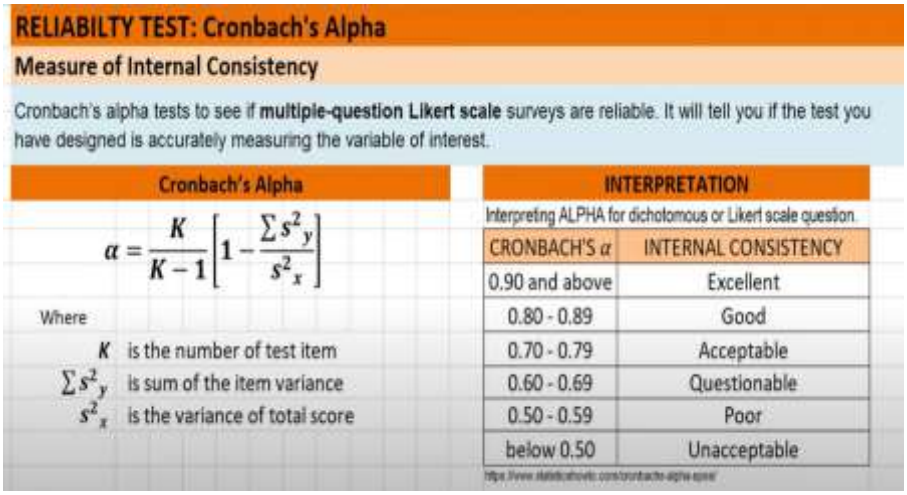

Fig.3: Cronbach's Alpha Reliability Test.

8 Research Strategy

This research used SERVPERF (Quality of Service) technology as developed by Fahruzi (2022). The survey questionnaire also examined the trainees' expectations and perspectives on the services provided (Table 1). The five-point Likert scale (1–5) was used to assess service performance in relation to trainees' expectations and achievements by interviewing trainees about the quality aspects of the product (Parasuraman et al., 1988). Respondents/trainees of private training institutes were urged to assess the importance of service quality in terms of relevance and then to determine the dimensions that corresponded to their objectives of e-training at the private training establishments. Then the data from the 22 items were used to compare the importance and performance of the online technology in the private training workshops and displayed in a two-dimensional graph where the vertical axis represents the importance of the selected feature and the horizontal axis the delivery of the service by the private training workshops.

Table 1: Dimensions and Item Statements of SERVPERF.

Dimensions	Item Statement
Tangibility (4 items)	Q1: The institute has up-to-date tools for online learning. Q2: The tools used for online learning are visually appealing. Q3: Faculty members appear well-dressed and neat in online lectures. Q4: Online learning tools seem compatible with the type of service provided.

Reliability (5 items)	Q5: When the institute promises something by a specific time, it delivers it. Q6: Problems are dealt with sympathetically and reassuringly.Q7: The online learning services are dependable. Q8: Service is delivered in the promised time. Q9: Accurate record keeping of students' activities.
Responsiveness (4 items)	Q10: Informing the students exactly when the services will be delivered. Q11: Receiving quick services. Q12: Faculty and staff are always helpful. Q13: Faculty and employees have time to respond promptly to students' requests.
Assurance (4 items)	Q14: Faculty members and employees are trustworthy. Q15: You feel safe when performing transactions with the institutes. Q16: Faculty and staff are polite. Q17: Good support from the institute allows faculty members and staff to accomplish their job well.
Empathy (5 items)	Q18: The institute gives individual attention to the student. Q19: Personal attention from faculty and staff. Q20: Faculty members and staff are aware of your needs. Q21: The institute has your best interests in mind. Q22: Suitable operating hours for online learning services.
General Measurements	**Q1: Future interest behavior:** My willingness to use online learning at private institutes in the Jazan region next year: **Q2:Satisfaction:** My feelings toward private institutes' online learning services in the Jazan region can best be described as:

The two-dimensional chart has four quarters: Quadrant 1, "Focus here," in the northwest corner, has data of great importance and poor performance results requiring management priority. Quadrant 2, "Preservation," indicates the importance and high performance that management needs to maintain. Quadrant 3, the low-priority quadrant in the southwest corner, was classified as low in importance and performance. Quadrant 4 shows unnecessary, less essential features that management must address due to high-performance grades.

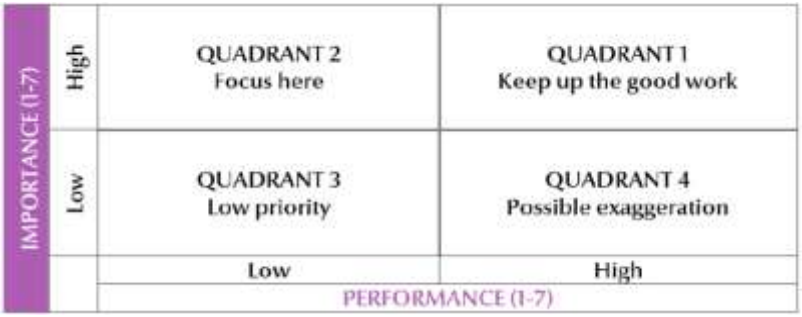

Fig. 4: The Importance–Performance Analysis (IPA) Matrix.

9 Discussion

The questionnaire was printed and distributed in the fall of 2022 to a random sample of students who studied or graduated from private institutes in the Jazan region during and after the COVID-19 pandemic. Valid responses were obtained for 225 questionnaires. The reliability test was used to see if the students' responses to any of the item statements were related to their responses to the others. The IBM SPSS Statistics Version 26.0 was used to calculate Cronbach's alpha for each dimension (Table 2).

Table 2: Cronbach's Alpha for Each Dimension of SERVPERE.

Cronbach's Alpha	Total						
	Tangibili-ty	Reliability	Responsiv e-ness	Assurance	Empathy	Total	RESULT
	Q. 1, 2, 3, 4	Q. 5, 6, 7, 8, 9	Q. 10, 11, 12, 13	Q. 14, 15, 16, 17	Q. 18, 19, 20, 21, 22		
α P	0.70	0.76	0.70	0.77	0.81	0.91	**Excellent**
α I	0.84	0.83	0.82	0.81	0.81	0.92	**Excellent**

The fact that all the dimensions have values greater than 0.70 indicates that the questionnaire is reliable. The average values for each item statement were then calculated across all respondents. Table 3 summarizes the findings for each item statement and section in terms of importance and performance.

Equation 1 (SQi = Σ k j=1Wi j ·Pi j) was used to calculate the service quality performance, and Equation 2 (Wi j = Ii j − Min / Max−Min) was used to calculate the weighting components.

In importance for the five dimensions, the questions with the highest score are Q4 on tangibility, Q8 on reliability, Q13 on responsiveness, Q16 on assurance, and Q21 on empathy.

Assurance has the highest average importance score of 4.389, showing that students expect more in assurance than in other areas. By contrast, the questions with the lowest score of importance for the five dimensions are Q2 on tangibility, Q5 on reliability, Q10 on responsiveness, Q17 on assurance, and Q19 on empathy, and tangibility has the lowest average importance score of 3.898, showing that the students did not seek tangibility. Q2 has the lowest importance score, meaning that students do not seek visually appealing tools in online learning.

The two-dimensional graph was then plotted using the average service quality score (SQj) for each item statement. The horizontal axis indicates how well the private institutes are perceived to conduct their online learning services, while the vertical axis shows the importance of the activity to the students.

Table 3. Questionnaire Analysis and Results

						Average			
Dimension	**Question**	**W**	**P**	**I**	**SQ**	**W**	**P**	**I**	**SQ**
Tangibility	1	**0.739**	**4.36**	**3.942**	**3.31**	**0.941**	**4.254**	**3.938**	**4.071**
	2	**1.003**	**4.21**	**3.898**	**4.30**				
	3	**1.010**	**4.25**	**3.934**	**4.34**				
	4	**1.013**	**4.20**	**3.978**	**4.33**				
Reliability	5	**1.016**	**4.187**	**4.018**	**4.270**	**1.023**	**4.250**	**4.143**	**4.316**
	6	**1.020**	**4.240**	**4.164**	**4.311**				
	7	**1.022**	**4.236**	**4.102**	**4.302**				
	8	**1.026**	**4.320**	**4.257**	**4.380**				
	9	**1.029**	**4.267**	**4.177**	**4.318**				
Responsiv eness	10	**1.031**	**4.316**	**4.009**	**4.363**	**1.036**	**4.304**	**4.115**	**4.327**
	11	**1.035**	**4.240**	**4.146**	**4.273**				

	12	1.037	4.289	4.066	4.292				
	13	1.042	4.373	4.239	4.378				
Assurance	14	1.045	4.253	4.314	4.399	1.049	4.266	4.306	4.374
	15	1.048	4.262	4.319	4.416				
	16	1.052	4.364	4.389	4.437				
	17	1.053	4.182	4.204	4.245				
Empathy	18	1.057	4.169	4.252	4.224	1.064	4.244	4.281	4.255
	19	1.060	4.240	4.226	4.224				
	20	1.064	4.240	4.265	4.288				
	21	1.068	4.262	4.336	4.293				
	22	1.070	4.311	4.323	4.244				
Average		1.025	4.262	4.162	4.270				

The item statements in the first quadrant, "Concentrate here," have low performance but are highly important to the students. As a result, these features should receive the most attention to increase student satisfaction. It is thought to provide the most significant impact for the least investment. Q17, Q18, Q19, and Q20 are the items in this quadrant. Q17, Q18, and Q19 belong to assurance and empathy, and they measure the excellent support from the institutes that allows faculty members and staff to accomplish their job well by giving individual attention to the students. Q20 belongs to empathy and measures students' perception of whether faculty members and staff in private institutes know their needs. It is suggested that the attributes that boost students' satisfaction relate to those questions.

In the perception section, the questions with the highest score for each dimension are Q1 on tangibility, Q8 on reliability, Q13 on responsiveness, Q16 on assurance, and Q22 on empathy. Responsiveness has the highest average perception score of 4.373, which shows that students value prompt responses to requests from faculty and employees. By contrast, the questions with the lowest performance score for the five dimensions are Q4 on tangibility, Q5 on reliability, Q11 on responsiveness, Q17 on assurance, and Q18 on empathy. Empathy has the lowest average importance score of 4.169, which shows that the students do not seek tangibility but need more individual attention.

In the second quadrant, "Keep up the good work," several item statements are included, namely Q8, Q13, Q14, Q15, Q16, Q21, and Q22, which indicate that these attributes are essential and that the students are satisfied with the performance of the management. It demonstrates that private institutes keep up with their excellent work for online learning. When they promise something by a particular time, they deliver and hence are reliable and trustworthy. The private institutes were found to have accurate record keeping, and the students felt safe when performing transactions with the institutes. The students also felt that the faculty members and staff were polite, that the institute had the best interests of students in mind, and that the private institutes offered suitable operating hours for online learning services.

Most statements in this quadrant relate to the assurance and empathy dimensions, indicating that the private institutes can deliver knowledge and instill trust and that the staff is courteous and provides compassionate and personalized customer care. This means that management should maintain these qualities to retain customers.

The low-priority quadrant identifies features that work satisfactorily but are perceived as less important by students. Q2, Q3, Q5, Q6, Q7, and Q11 make up this quadrant. Although the results indicate that both reliability and a portion of the tangibility items are not regarded as crucial, this does not mean that management should abandon efforts to improve service. Employees who can preserve their empathy for students could be rewarded by management. Students who are satisfied with the quality of the features are more likely to convey positive word-of-mouth advertising. Students regard the items in the "possible overkill" quadrant as less important and excessive. Thus, they must be minimized due to the excessive investment. Better outcomes could be expected if these efforts are focused on other areas.

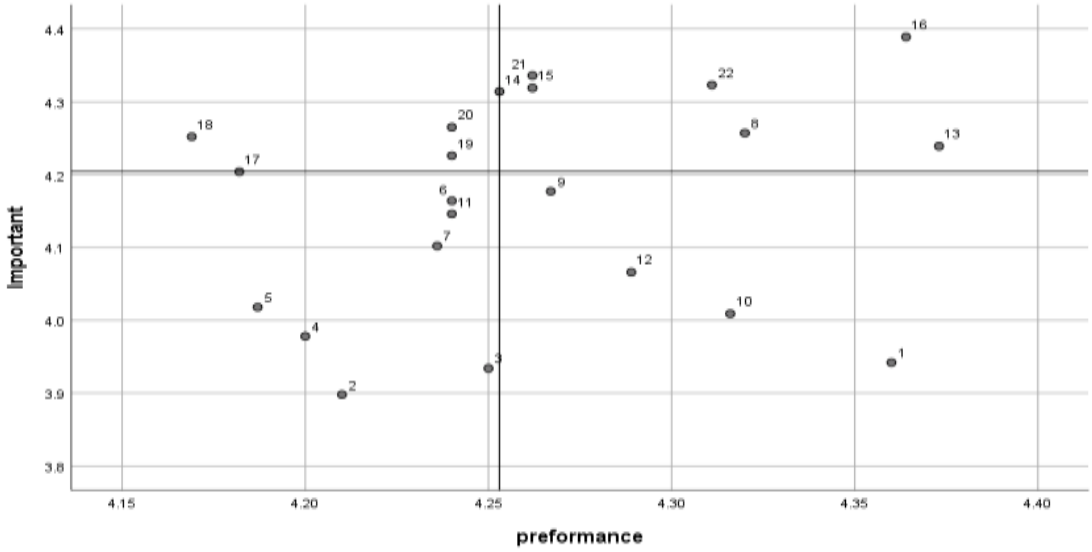

Fig. 5: IPA Results Using IBM SPSS Statistics Version 26.0.

Table 4 shows the average scores for each service quality dimension. The values are plotted in Figure 4, which reveals that the average importance is high for most dimensions except tangibility, especially assurance, and empathy. Average performance is high for all dimensions, and average service quality is high for all dimensions except tangibility.

Table 4: The Average Scores for Each Service Quality (SQ) Dimension.

Dimensions	Average SQ	Average Performance	Average Importance
Tangibility	4.071	4.254	3.938
Reliability	4.316	4.250	4.143
Responsiveness	4.327	4.304	4.115
Assurance	4.374	4.266	4.306
Empathy	4.255	4.244	4.281

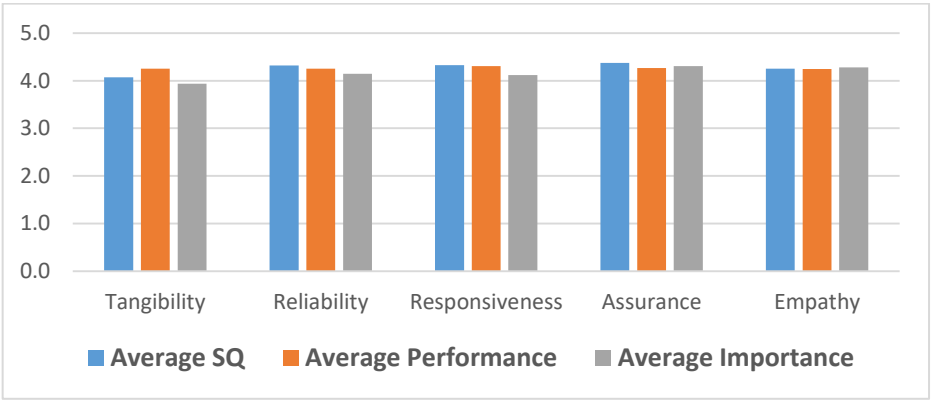

Fig.6: Average Scores for Online Learning Service Quality in Private Institutes in the Jazan Region

Two questions were included at the end of the questionnaire to measure satisfaction with the online learning service and future interest. The results are shown in Table 5. Figure 7 shows the plot of the data in Table 5 and reveals a trend toward "very high" regarding future interest and satisfaction.

Table 5: Future Interest and Satisfaction.

Answer	Future interest	Future interest %	Satisfaction	Satisfaction %
Very High	136	60%	140	62%
High	66	29%	59	26%
Neutral	17	8%	18	8%
Low	4	2%	6	3%
Very Low	2	1%	2	1%
Sigma (Σ)	225	100%	225	100%

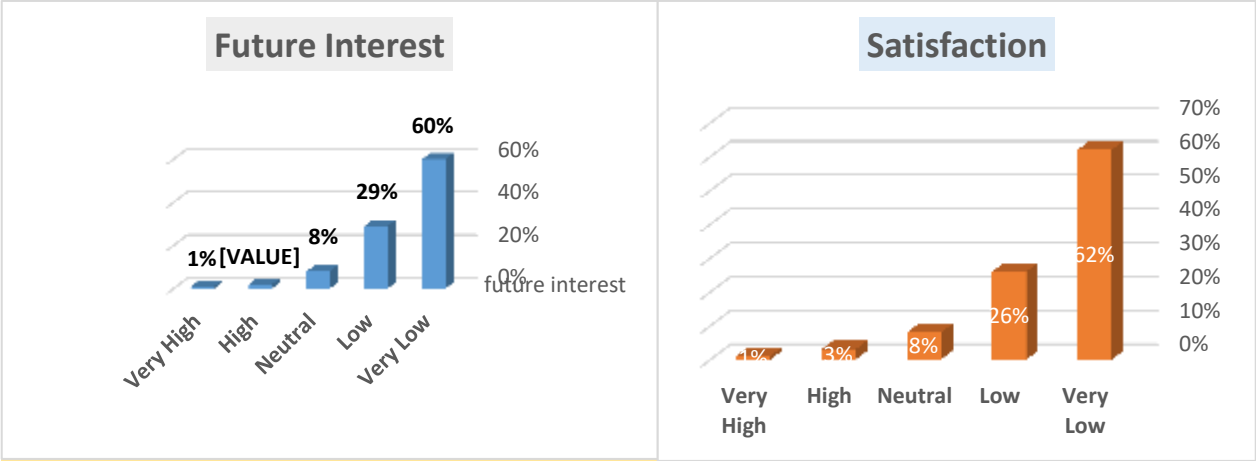

Fig.7: Future Interest and Satisfaction.

10 Conclusions

Weighted SERVPERF was used in this study to evaluate service quality. The modified service performance model (Modified SERVPERF) has been used to assess service quality, and it was used in this study to evaluate the perceived quality of online learning at private institutes in the Jazan area. Aspects of the model have been discovered to offer a quick and affordable way to gauge service quality. The results show that evaluating the service quality of training provided by private institutes in the Jazan region has several potential advantages for their management. Managers may more effectively tailor their marketing initiatives to ensure that consumers' expectations are met by discovering, prioritizing, and fixing areas of service insufficiency and allocating necessary resources where they are required. Additionally, it is possible to modify advertising to ensure customers have reasonable expectations of the services offered. Based on the overall performance scores, it was found that UBT has to work more to raise the caliber of its e-learning services.

Considerations for future studies

The private institutes in the Jazan region underline the importance of implementing regular methods for measuring the quality of online learning services and other services provided under the supervision of teachers. This will allow students to express their opinions in questionnaires and may improve their overall satisfaction. By understanding the interests, expectations, and perceptions of trainees regarding the services of private institutes, professional technical establishments can better meet the students' needs and improve the quality of their services.

References

[1] Abdulrahman, L., Abdelrahim, E., Fathi, A., & Rafdan, A. (2020). Distance education as a response to pandemics: Coronavirus and Arab culture,. Technology in Society, **63**, 1–11.

[2] Alakrash, H., & Razak, N. (2022). Education and the Fourth Industrial Revolution: Lessons from Covid-19. Computers, Materials, and Continua, **70(1)**, 951–962.

[3] Eleyyan, S. (2021). The future of education according to the Fourth Industrial Revolution. Journal of Educational Technology and Online Learning, **4(1)**, 24–30.

[4] Rengin, P. (2021). This challenge is advancing education solutions to help students thrive. https://www.weforum.org/agenda/2021/06/advancingeducation-solutions-through-the-worldclass-educationchallenge/ Accessed 2/11/2022.

[5] Li, C., & Lalani, F. (2020). The Covid-19 pandemic has changed education forever. This is how. https://www.weforum.org/agenda/2020/04/coronaviruseducation-global-covid19-online-digital-learning/ Accessed 2/11/2022.

[6] Dhawan, S. (2020). Online learning: A panacea in the time of Covid-19 crisis. Journal of Educational Technology Systems, **49(1)**, 5–22.

[7] Kim, S. H., & Lee, M. J. (2019). Importance–performance analysis of mobile learning service quality in Korea. Sustainability, **11(3)**, 558.

[8] Wang, C. Y., & Chen, M. C. (2014). Evaluating e-learning systems success: An empirical study. Journal of Educational Technology & Society, **17(1)**, 1–12.

[9] Wenzel, S., & Silbereisen, R. K. (2017). Importance-performance analysis of e-learning skills in vocational education and training schools in Germany. Journal of Vocational Education & Training, **69(4)**, 628–649.

[10] Al-Fraihat, D., Joy, M., & Sinclair, J. (2020). Evaluating the quality of e-learning systems in higher education using an adapted E-Qual scale: A case study from Jordan. Education and Information Technologies, **25(1)**, 301–322.

[11] Chua, Y. P., & Lim, Y. Y. (2017). Importance–performance analysis of e-learning platform in higher education institutions. Interactive Technology and Smart Education, **14(3)**, 226–245.

[12] Jones, P., & Ramanau, R. (2019). The impact of e-learning service quality and perceived value on students' satisfaction. Journal of Business Research, **98**, 424–437.

[14] Kanan M., Zerban, A., Abunar, S., El Harbi, A., Weheba, G., Assaf Ahmed, R.,Mostafa, G., Abdultawwab, M., & Haddad, T. (2023). Online education and managing service quality with the challenges of Covid-19: The case of University of Business and Technology (UBT) Saudi Arabia. Applied Mathematics and Information Sciences, **17(2)**, 201–207.