

# The Measurement Model of the Pharmacy Education Service Quality: An Empirical Quest Based on Two Approaches

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## ABSTRACT

**Objectives:** The objective of this study to build a comprehensive model to measure the service quality of the pharmaceutical institutes in India. At the same time, the author also validates the model with two different approaches of service quality measurement that belongs to gap score and perception-only measure. **Materials and Methods:** The eight pharmacy institutes are selected randomly from eastern India and then 370 respondents take part in this survey process. The model has been developed with exploratory and confirmatory factor analysis based on perception-only and gap (perception minus expectation) scores. Finally, the model has been validated with discriminate validation and OLS regression methods. **Finding:** The conclusion of this study belongs to a comprehensive model to measure the service quality of pharmacy institutes with the help of 14 variables under 4 latent factors of education service quality. This model may be applied to any pharmacy institute that is offering a graduate pharmacy program. **Practical Application:** For academicians, this study provides a new comprehensive model which is applicable for any approach of measuring the service quality of pharmaceutical education institutes in India. Simultaneously, this model might provide a road map to the Government for improving the quality of education in the pharmacy education system.

**Key words:** Pharmacy education, Service Quality, SERVIQUAL, SERVIPERF, Indian Pharmacy Institutes.

## INTRODUCTION

Service sectors are labor-intensive sectors and these having a high potential for employment generation. However, the sustainability of any service sector is dependent on its maintenance of quality. Hence, service quality is an important area of discussion in management literature.<sup>1</sup> In the era of globalization, quality plays a significant role in order to accomplish a competitive advantage over competitors and maintain market leadership in the business world. In order to sustain and grow within the framework of an increasingly competitive market, organizations must adopt quality management practices. Strategically, retaining the unscaled service quality is basically deploying organizational resources and capabilities to nullify

the threat of competition arising out from the business environment. Therefore, business organizations, particularly service organizations are now considering quality management practices.<sup>1</sup>

Like all other service industries, the education sector has a direct impact on society for social-economic growth and human resource development. Especially, higher education is acclaimed as one of the most important factors for national development. It also represents the major source of investment by individuals to contribute to national development. Once, Kazemi<sup>2</sup> said that the glory of a community depends not only on the depth of higher education but also on the quantitative and qualitative development of an educational system.

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Moreover, education only attaches the individual in contact with the values, but also it raises the functionality of the individual to the societal level. In this way, the educational system becomes a key factor in societal change. It has induced the capability of innovation, the willingness of cooperation and interconnection between communities.

Among the education service industry, technical education, particularly pharmaceutical education, has a direct bearing on society for health-specific economic development. One of the key skills required to a pharmacist is the ability to handle a patient in support of a doctor that satisfies patient by correct care, operation and control of disease condition.<sup>3</sup> The substantial evolution in the pharmaceutical industry of developing nations has dramatically changed the role of pharmacy professionals from hospital pharmacists to patient-centric professionals.<sup>3</sup> Globally, the traditional pharmaceutical course is primarily designed to conduct academic research with limited resources; however, the rapid innovation in the same industry enforces to produce the graduates with skills required for better employability. The researchers have observed the importance of pharmacy program in transforming the skill of students toward patient-centric professionals, who will work for society in the future. Thus, some researchers have opined that the pharmacy graduate program should not confine to the knowledge of pharmacy subject rather career orientation program also helps in the enhancement of the performance of pharmacy graduates.<sup>4</sup>

In this regard, the pharmacy educational institutes (PEIs) are playing an important role in transforming pharmacy education, research, and innovation for the sake of societal development. The structure of pharmaceutical education is not different from the current scenario of higher education institutes in India, which are competing for resources and quality. The resources like research funds, qualified faculties, and infrastructure affect the quality of the higher education system in developing countries.<sup>5</sup> In India, the students have a wide range of options to prefer which institution to pursue their interests because of an increased number of institutes and university departments of pharmacy. Singh<sup>6</sup> has referred to the absence of quality education and research facilities in the pharmacy institutes as one of the possible reasons behind the poor performs of the pharmacy institutes in India. Many other researchers<sup>7-11</sup> have also opined similarly to Singh<sup>6</sup> in different country contexts about pharmacy education. However, the course-specific feedback on the classroom experiences

of the students is not sufficient for the assessment of the quality of pharmacy education. More systematic efforts are required to measure or examine the quality of education and the course content for the pharmacy program. However, this is considered to be a challenge for measuring the quality of the education service offered by HEIs. But despite all environmental challenges, it is necessary to measure the service quality of pharmacy education institutes for sustainable health-economic growth of a nation.

According to experts, students are to be considered as the primary customer<sup>5</sup> where faculty members are service providers and both are significantly co-creators of the service delivered (training imparted) to former. Hence, understanding and measuring the service quality opinion of students is highly solicited.<sup>12</sup>

All these facts converge into a point that the quality of pharmacy graduates in India is in question and there is a necessity of maintenance of service quality of pharmacy education in the eyes of primary stakeholder namely students. Further, to offer the quality of service in pharmaceutical education, the author needs to measure the same, hence in this research work author has focused on a particular question.

How the pharmaceutical education service quality measured?

Therefore, the author has felt the necessity of reviewing the present state of research works in the field of technical higher education and further develop the research objectives with a more comprehensive understanding of the primarily explored issues. Thus, in the next section of the literature review, the author has presented a brief discussion on education service quality measurement and pharmacy education service quality in a different context of countries and participants.

## Literature review

### Higher Education Service Quality Management

The authors<sup>8,10,13-15</sup> have delineated the education service with other services like healthcare, bank, telecom and hospitality services. In the case of education service, the interaction between the primary customer (student) and service provider (faculty/administration) are very high and it differs from encounter in form of all other services like healthcare, bank, telecom and hospitality services are having much less encounter both the parties and consequential to this, the chance of reshaping of expectation by reducing it is less.<sup>16</sup>

Service quality literature can be segregated with four schools of thought first one is comprised of those researchers,<sup>17</sup> who believe a service operation is a

predominantly encounter /interaction between customer and service provider, especially with the front line service staffs and thus, the relationship building is the key for service satisfaction of the service receiver. The second school of thought is based on the opinion of the Gummesson (1995)<sup>18</sup> and others<sup>19</sup> that give an equal focus on service process. In fact, proponent of this school's analyses four stages- Design, Production, Delivery and rational of the service quality. The third one covers the research, writing of Zeithmal, Parasuraman and Berry (1985, 1988, 1991),<sup>20-22</sup> Buttle (1996)<sup>23</sup> and that has mainly measured the quality of service with certain objective methods and parameters. The fourth one in this regard is related to customer satisfaction as an outcome of service quality. Some researchers believe that customer satisfaction is related to service quality, and they are high in number.

How to measure the quality of service? This question has emerged debates among management researchers since the development of 'Service Quality Gap' model.<sup>16</sup> The measurement of quality of service is always a subject for concern because service is far more complex than that of a product. Only in the case of a few services, quality is anticipated before its consumption.<sup>24,25</sup> However, in the case of the majority of services, service quality is measured during or after the consumption.<sup>26</sup> The service is difficult and multifarious since it is intangible, perishable, heterogeneous (dependent on persons involved and the environment) and inseparable (service producer and service consumer are embedded).<sup>21</sup>

According to Gronroos (1982)<sup>24</sup> and other,<sup>27</sup> service quality can be measured how delivered service is matched closely with the expectation of the customer. This definition of service quality is elaborated and reemployed further by researcher.<sup>20-22,28</sup> Infact, they have included a service process and outcome in measuring the quality of the service and offered a process based service quality gap model.<sup>20</sup> Later, they have also supplemented their initial work by offering five facets of service quality and that is well known as SERVQUAL.<sup>21-22,28</sup> However, in all cases, their methods of measurement of service quality followed estimating the gap between expected and actual service delivered.

Acceptance of SERVQUAL is widespread since lion shares of service quality research have been carried out in the similar line across the nations. On the other way around, critical evaluation of the SERVQUAL model is also observed and it leads by Cronin and Taylor (1992),<sup>29</sup> Carman (1990)<sup>30</sup> and others.<sup>23,31,32</sup> Critiques namely Carman (1990)<sup>30</sup> and Cronin and Taylor (1992)<sup>29</sup> opined that there is very less empirical

and conceptual support in favor of considering service quality as a gap between expectation and perception (Actual). Hence, Cronin and Taylor (1992)<sup>29</sup> carried out a comparison of SERVQUAL and their proposed SERVPERF (performance only measure for service quality)

in terms of empirical survey results. Cronin and Taylor (1992)<sup>29</sup> have been influenced by opinions of Churchill and Suprenant (1982),<sup>33</sup> Bolton and Drew (1991)<sup>34</sup> and others<sup>35</sup> who preferred comparing actual performance with customer expectations to measure service quality. Hence, in the review, the principle of measurement of service quality has examined whether perception minus expectation principle has been followed or not (perception of performance-only measure of service quality) by most of the researches in the field of higher education as a service. Here, whether corresponding literature has developed a new construct (measurement items) or not are also presented with the country of origin. Many authors opined specification is more important than generalization<sup>16,36</sup>

After reviewing the literature based on education service management, the author able to draw the reader attention to some key outcomes of the literature as follow.

- There are two different approaches of measurement of service quality in higher education, and these are perception minus expectation (Gap) and perception only.
- The majority of researchers have decided not to go with SERVQUAL constructs rather execute higher education-specific constructs.
- In the Indian context, Mahapatra and Khan (2000)<sup>15</sup> have proposed a systematic integrated model *EduQUAL* to understand the level of satisfaction of all stakeholders in the technical education system.
- Another instrument *SQM-HEI* has been proposed by Senthikumar and Arulraj (2011)<sup>5</sup> that explained the placement is the main criteria for the parents and the students to select a higher education institute in India. This model has also revealed that the three dimensions- *Teaching methodology*, *Physical Study Resources*, and *Disciplinary Action*, have improved the chances of employability of a student in a higher education institute.
- The researcher has argued that prestigious Bodies like AICTE and UGC should take the initiatives to promote the concept of the industry and institutes' interaction with each other from the primary stage of course designing to the final stage of course completion.

- Mandal and Banerjee (2012)<sup>37</sup> have identified three dimensions- *Industrial focus, Industrial readiness, and the quality of program aspects of the measurement of engineering program quality.*

### Pharmaceutical Education Service Quality Measurement

In the context of pharmaceutical education service quality, Holdford and Reinders<sup>9</sup> have described the overall service quality as the combination of the functional (process) quality and the technical quality. The functional quality has items related to *learning resources, faculty attributes, and the administration* whereas technical quality has items related to the *intellectual development and mental satisfaction* of the students. Whereas Gu *et al.* (2016)<sup>11</sup> have advocated the TQM concept implementation in pharmacy education in China. This study has suggested developing a climate in which the organization can deliver high-quality education. In India, Singh (2016)<sup>6</sup> has emphasized the extensive implementation of 'Design in Education' (QbDE) in the context of pharmaceutical education. This model elaborates nine elements at the micro-level for the upgradation of overall pharmacy education quality. Moreover, Gupta and Mandal<sup>7</sup> have identified five dimensions that are required to be improved for the enhancement of the quality of pharmacy education in institutes of India. In summary, the author has searched out seven studies exclusively based on pharmaceutical education and where it has been observed that two authors have constructed a model for education service quality measurement. Mandal and Gupta, (2018, 2019)<sup>8,10</sup> applied different approaches whereas Holdford *et al.* 2001, 2003<sup>9,38</sup> have applied different approaches to measure the same.

Finally, after reviewing the literature, the author has identified the three key observations which are as follows:

From a global perspective, a few researchers have identified service quality facets and it is not wise to extend them blindly for measuring service quality gaps of the Indian pharmaceutical education. Thus, it is imperative to call for empirical research to understand the facets of the service quality of pharmaceutical education and to measure the service quality gap of the same.

In the perspective of the Indian environment, the service quality determinants of pharmaceutical education were studied, but not empirically analyzed in each format of educational institutes (Like private University, Government University, Private Institutes) hence, the author has identified a scope to carry out the same in India with empirical justification.

There are two schools of thought regarding the measurement of service quality gap; SERVQUAL measures the gap between perceptions minus expectation of the customers whereas SERVPERF measures the same with performance only.

Therefore, the objective of this study is to identify the comprehensive determinants of pharmaceutical education service quality which apply to all kind of institutes as well as in with any principle of education service quality measurement either it is based on the principle of Perception-only or performance minus expectation (i.e., Gap) measurement.

### Methodology

#### Questionnaire Development

The author has considered directly 45 items on the Likert scale which are design by Gupta and Mandal<sup>7</sup> and develop a questionnaire for the students as respondents for their expectation from a pharmacy Institute regards to education service quality as well as this questionnaire continues with similar kind of items with regards to the perception or actual service receiving from institutes by students.

#### Sampling Frame

The prime objective of this study to provide a model to measure the service quality of the pharmacy education institutes and for that author must consider respondents from across the country India; but physically it is become impossible to conduct this survey. Therefore, the author has set the limit of survey operation within West Bengal since here ninety percent of the students' intake has been made by privately owned institutes for a pharmaceutical graduate program.<sup>39</sup> Secondly, the state holds seven percent of the Indian population<sup>40</sup> and almost all Indian population types living here. Therefore, it represents India perfectly. A systematic cluster based random sampling approached is applied to collect the sample. Here in West-Bengal state, there are 24 government and private pharmaceutical institutes, which are having approximately 2000 enrolled students per year under the pharmacy graduate program.<sup>29</sup> In the data collection process of multi-stage level. In the first stage, 8 out of 24 institutes are selected from two different strata of the institutes grouped into by the parameter of private or government aided. Then in the next stage, the concerned higher authorities of these 8 institutes have been approached with a formal letter to get permission to survey within groups of students. At this stage, the author also asked the authorities about the list of enrolled students in the graduate pharmacy program. From these lists, 4750 students' particular

have been received and the author has requested 1163 students (983 from private institutes and 180 from government institutes) randomly to participate in the sampling process. As per sample size calculation rules, when the population size is 4750 with a 95 percent confidence interval and with an allowance of 5 percent margin of error minimum size of the sample should be 356.<sup>41</sup> In fact, the author got full responses from 370 students as the rest did not furnish the questionnaire completely or deny to participate in the sampling process.

### Data Collection

The author has conducted the survey in different stages during the semester classes. During a working break between two classes, the author has approached the respondent. At the same time, I have also offered assistance for explaining statements if any respondent requires the same. In the first stage, the author has offered the first questionnaire to the respondent than after a one-week gap of the initial response, I again met with the same respondent with a second questionnaire for completion of the survey. Purposefully, the author has taken responses about expectation and actual from a respondent in two different times so that responses remain independent of each other.<sup>42</sup>

### Research Methods

To attend the research object of this study, it is necessary to build two exploratory models of education service quality based on relevant service quality items by calculating the gap score that is performance minus expectation and another by performance score (perception-only). The two tests, 'the Bartlett test of Sphericity' and 'KMO test of sample adequacy' are conducted that are required to test before applying the Principal Component Analysis (PCA) technique. The Bartlett test of Sphericity, which is an authentic indicator of the suitability of data for factor analysis, is found to be significant ( $\chi^2= 2039.082$ ,  $df=91$ ,  $p< 0.000$ ;  $\chi^2= 1313.30$ ,  $df=91$ ,  $p< 0.000$ ) respectively in both the cases for perception-only and gap score based models. Again, the Kaiser-Meyer-Olkin (KMO) indexes are 0.664 and 0.709 respectively for both the models that are greater than 0.6, which is considered adequate for factor analysis.<sup>43</sup> Thus, both results allow us to proceed further with the principal component analysis (PCA) technique.

### Result of PCA with Reliability and Validity

The principal component analysis explains the existence of four factors with satisfactory variance explained (74.09% and 68.63%) in both the cases respectively,

which are adequate for further analysis. The internal consistency of each factor is examined with two tests namely Cronbach's alpha and composite reliability (CR) tests. Here, Cronbach's alpha values range from 0.532 to 0.896 and composite reliability (CR) range from 0.722 to 0.912 (Table 1,2).

These values are well acceptable according to the literature references.<sup>43,44</sup>

After that, the results of construct validity have been checked through the variance values of convergent and discriminant validities. The convergent validity is confirmed by Average Variance Extracted (AVE), which is found to be greater than 0.05 in all cases<sup>45</sup> (Table 1,2).

The Discriminant validity criteria have been evaluated by checking the square root of AVE for each construct and that is found to be greater than the inter-correlations with other constructs. Based on the opinion of Gefen *et al.*,<sup>46</sup> our research has been cleared with the discriminant criteria. The Table 3 and 4, show the square root values of AVE that is presented in bold is greater than the off-diagonal values of inter-correlation.

### The naming of the Dimensions

In this section, it is important to name the latent factors related to both models. The first dimension comprises six variables (from V1 to V6) and these variables state various scopes for modernization and innovation like the scope for modern laboratory, up-gradation of the library, and entrepreneurial development. Thus, the latent factor that is operating behind is 'Modern Academic Facilities' and we considered this for the naming of the first dimension. Similarly, the next four variables (from V7 to V10), which are the Industrial training and arrangement of industrial interaction, may be expressed as 'Career Prospective'. The third dimension (V11 and V12) states 'Interdisciplinary Skill' development in the field of sales and marketing as it focuses on marketing study and learning of sales presentation. Last but not the least need of the students is 'Social Status' of Institute of the course and for that they further want more industrial exposure to strengthen their demand.

### Confirmatory Factor Analysis

In the previous sections, one exploratory model was developed in two different approached to measure the pharmaceutical education service quality. Now, in the present section, the author has employed confirmatory factor analysis (CFA) intending to confirm the proposed models (exploratory models). For that purpose, the study utilized absolute, incremental and parsimonious fit criteria (indices). In the Table 5, the details have been shown.

**Table 1: Details of the items with the four factors of the Perception-only model.**

	Factor Name	Modern Academic Facilities	Career Prospective	Interdisciplinary Skill	Social Status
V1	Well-equipped laboratories with adequate chemicals.	0.892			
V2	Study materials.	0.844			
V3	Adequate books in library for relevant subjects.	0.816			
V4	Development verbal and written communication.	0.790			
V5	Animal house with adequate* numbers of species.	0.777			
V6	Faculties for all subjects and specialization.	0.712			
V7	Industry experts are invited.		0.932		
V8	Modern computers with the latest software.		0.828		
V9	Industrial training.		0.701		
V10	White board along with LCD projector.		0.604		
V11	Marketing specialized subjects.			0.847	
V12	Adequate number of supporting and technical staffs.			0.648	
V13	Alumni interaction is possible for industrial skill development.				0.832
V14	College well recognized by my relatives and friends				0.729
Total variance explains (74.09%)		32.62%	18.25%	12.75%	10.47%
Composite Reliability		0.918	0.855	0.722	0.758
Cronbach's Alpha (0.817)		0.896	0.782	0.539	0.548
Average Variance Extracted (AVE)		0.612	0.569	0.603	0.651

**Table 2: Details of the items with the four factors of the Gap model.**

	Factor Name	Modern Academic Facilities	Career Prospective	Interdisciplinary Skill	Social Status
V1	Well-equipped laboratories with adequate chemicals.	0.852			
V2	Study materials.	0.846			
V3	Adequate books in library for relevant subjects.	0.777			
V4	Development verbal and written communication.	0.738			
V5	Animal house with adequate* numbers of species.	0.732			
V6	Faculties for all subjects and specialization.	0.672			
V7	Industry experts are invited.		0.881		
V8	Modern computers with the latest software.		0.768		
V9	Industrial training.		0.735		
V10	White board along with LCD projector.		0.635		
V11	Marketing specialized subjects.			0.804	
V12	Adequate number of supporting and technical staffs.			0.772	
V13	Alumni interaction is possible for industrial skill development.				0.840
V14	College well recognized by my relatives and friends				0.754
Total variance explains (68.63%)		29.12%	18.03%	11.14%	10.34%
Composite Reliability		0.898	0.844	0.766	0.778
Cronbach's Alpha (0.789)		0.797	0.763	0.531	0.529
Average Variance Extracted (AVE)		0.596	0.577	0.621	0.637

**Table 3: Discriminant Validity of Four Factor Model Based on Perception only.**

	MCF	CP	IS	SS
MCF	<b>0.782</b>			
CP	0.210	<b>0.754</b>		
IS	0.497	0.123	<b>0.776</b>	
SS	0.011	0.090	0.400	<b>0.806</b>

Note: MAF-Modern Academic Facilities, CP-Career Prospective, IS-Interdisciplinary Skill, SS-Social Status

**Table 4: Discriminant Validity of Four Factor Model Based on Gap Score.**

	MCF	CP	IS	SS
MCF	<b>0.772</b>			
CP	0.329	<b>0.759</b>		
IS	0.315	0.172	<b>0.788</b>	
SS	0.387	0.142	0.019	<b>0.798</b>

Note: MAF-Modern Academic Facilities, CP-Career Prospective, IS-Interdisciplinary Skill, SS-Social Status.

**Table 5: CFA model fit indexes with comparative experimental model values.**

Types of Fit	Model Fit Indexes	Recommended Values	Model based on Perception-only score	Model based on GAP Score
	No. of factors in proposed Model		4 factors	4 factors
Goodness of Fit Measure	Chi-Square/df	Less than 3.000 for the nested models	2.880	2.780
Absolute Fit Measures	GFI (Goodness of Fit)	Greater than 0.80	0.849	0.844
	RMSEA	Less than 0.10	0.104	0.100
	RMR (Root Mean Square Residual)	Small RMR	0.016	0.017
Incremental Fit Measures	TLI (Tucker-Lewis Index)	Greater than 0.80	0.814	0.856
	IFI (Incremental fit index)	Greater than 0.80	0.806	0.826
	CFI (Comparative Fit Index)	Greater than 0.80	0.802	0.823
	NFI (Normal Fit Index)	Greater than 0.80	0.853	0.863
Parsimonious Fit Measures	AGFI (Adjusted GFI)	Greater than 0.80	0.823	0.883
	PNFI (Parsimonious NFI)	Greater than 0.80	0.851	0.869

Recommended values<sup>47,48</sup>

**Table 6: Result of regression analysis with significant variables of the different approaches.**

Dependent Variable- Overall satisfaction of students from the pharmaceutical graduate degree course			
Independent variables for Regression analysis		Model based on Perception-only score	Model based on GAP Score
All Responded based Model	R <sup>2</sup>	0.517	0.507
	Adjusted R <sup>2</sup>	0.483	0.465
	Effect Size of Model*	1.070	1.028
	Variables have a significant coefficient with Overall satisfaction	10 out of 14	10 out of 14

\*Effect size measured with Cohen-d<sup>49</sup> Measurement [ $R^2 / (1 - R^2)$ ], Cohen suggested that d=0.2 be considered a 'small' effect size, 0.5 represents a 'medium' effect size and 0.8 a 'large' effect size.

It has been observed from the comparative presentation of the specific indices that model based on gap and perception scores have been demonstrating almost equal kind of goodness of fit.

Furthermore, the author has carried out ordinary least square (OLS) regression, where all the items for measuring service quality in two different models have been considered as independent variables and overall satisfaction of the students from the service quality of that institute has been placed as a dependent variable because overall satisfaction is considered as a goodness of fit parameter of service quality in literature.<sup>32,49-51</sup>

Besides that in this study the coefficient of how many numbers of variables are significantly away from zero are also considered while developing a relationship with overall satisfaction. Based on all mentioned measurements, both the models based on perception-only and gap scores are at par the level of satisfaction. With an objective to analyse, two OLS results measure namely R<sup>2</sup> (goodness of fit), Adjusted R<sup>2</sup> (adjusted with a degree of freedom; more parsimonious) and effect size (ratio between variance explained and variance unexplained by model) proposed by Cohen (1992),<sup>52</sup> have been calculated (Table 6). Overall, the output

observed contrary statistical outcome though on a deeper level it unfolds the same thoughtful insight. In the next section, these are explained thoroughly.

## DISCUSSION OF RESULTS

The outcome of this study finally can be discussed in the following points.

Based on the two different types of modelling, it is seen that the Gap score (P-E) based pharmaceutical education service quality model is almost equal in performance in comparison with perception-only score based model for a similar purpose.

In the case of criterion variable (overall satisfaction) linked model 'perception-only score' based pharmaceutical education service quality model have shown slightly (insignificantly) higher performance over 'Gap-score' based model of identical purpose. Thus, the efficacy of two different pharmaceutical education service quality models is almost equal with these 14 variables.

This result will help to infer that the application of the gap score based evaluation of service quality (SERVQUAL orientation) or perception-only measures (SERVPERF orientation) with these 4 factors including 14 variables does not change the output. Hence, the study concludes that service quality if measured by the student, it is evidenced that the approach with perception-only score (SERVPERF orientation) or gap (P-E) score (SERVQUAL orientation) does not change the outcome of the result.

## CONCLUSION AND FUTURE SCOPE

It is customary to conclude the study with its outcome that may be relevant for existing academics, industry and society. This research work has delivered some of the important outcomes. The first one is comprehensive determinants for measuring the pharmaceutical education service quality in India. The Present study offers four facets of a comprehensive model that are not directly common with literature. Comparing with two of the relevant works of Holdfold and Reinder<sup>9</sup> and Holdfold and Patker,<sup>38</sup> present research deviates at least with three factors namely 'Modern Academic Facilities' (more majorly option for higher study), 'Interdisciplinary Skill' (whether they can be chosen as marketing executive or not) and 'Social Status' of the institute. These three facets represent the economic uncertainty of Indian youth and social approval for higher academic degree holders in Indian society. It is predominantly Indian culture-specific therefore not common with works

based on respondents of western nations. Holdfold and Reinder<sup>9</sup> and Holdfold and Patker<sup>38</sup> have focused on 'Career driven facilities', which is common with present work as 'Career Prospective' facet. Indian based researchers like Singh<sup>6</sup> have identified 'Annual job opportunities' that is the same as 'Interdisciplinary Skill' in present research work. Two dimensions like 'Modern Academic Facilities' and 'Social Status' are identified as a new one (Not mentioned in the literature) in the context of pharmaceutical education, but these are related to other higher education service quality measurement models of Joseph and Joseph.<sup>42</sup> Moreover, both facets are matched with the Indian economic environment that promotes the economic value and multiple job readiness of Indian people due to the competitiveness of the market.

This clearly manifests satisfaction is correlated uniformly with gap score and performance score for the responses gathered from all institutes. It unfolds the fact the researcher can calculate or measure the education service quality of pharmacy institutes by any approach of service quality measurement with these 14 variables. Though this study is enough to explain a major part of service quality of any pharmacy institute in India, yet it has some limitation of based on West Bengal, state of India. The author firmly believe that this study has further scope of improvement to extend this study to other region of country.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ABBREVIATIONS

**PEIs:** Pharmaceutical Education Institutes; **PCA:** Principal Component Analysis; **HEI:** Higher Education Institute; **AICTE:** All India Council for Technical Education; **UGC:** University Grants Commission.

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### PICTORIAL ABSTRACT



### SUMMARY

- Build a comprehensive model to measure the service quality of the pharmaceutical institutes in India.
- This model is developed with the help of 14 variables under 4 latent factors of education service quality.
- This model might provide a road map to the Government for improving the quality of education in the pharmacy education system.

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