

# Development of an Instrument to Assess Student Perceptions of the Quality of Pharmaceutical Education

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This paper describes a study that develops and tests a quality measure of pharmaceutical education. A 41-item instrument was created to assess educational service quality, defined as student perceptions of school service performance. The instrument assessed both perceptions of educational process (functional quality) and outcome (technical quality). Eighty-five fourth year pharmacy students evaluated four dimensions of educational quality; school learning resources, faculty performance, administration performance, and student perceptions of intellectual progress. Validity and reliability of the scale were demonstrated. Regression analyses showed the instrument explained 70 percent of School satisfaction, 49 percent of School commitment, and 39 percent of perceived educational value. Stepwise linear regression analyses of sub-scales demonstrated that perceptions of technical quality had greater impact on satisfaction, commitment, and value, while functional quality provided a small but significant effect. Further research is necessary to explore how service quality assessments vary over time and in different situations.

## INTRODUCTION

Educators have developed and utilized diverse measures to assess the quality of pharmaceutical education. Frequently used methods of measurement include course-specific evaluations of student opinions of the quality of classroom experiences and peer review by faculty of class content and delivery. Some pharmacy educators have moved beyond course-specific forms of assessment and identified and measured educational outcomes that evaluate student knowledge and competencies necessary to provide pharmacy services(1).

However, course-specific and competency-based forms of assessment do not provide a complete view of educational quality. Course evaluations are limited because they typically view courses as a series of discrete classroom encounters that can be evaluated in isolation of each other. Adding student competency assessments to course evaluations provides a more comprehensive view of educational quality, but it still leaves educators in the dark about student opinions of how those competencies were achieved. For example, understanding student self-assessments of competencies tells little about student opinions of the school facilities, courtesy of faculty members, or responsiveness of school administration.

In order to provide a more comprehensive view of the quality of pharmaceutical education, it is valuable to assess not only student perceptions of their educational outcomes but also their perceptions of the manner in which pharmaceutical education is provided. The educational process consists of the rich combination of experiences that occur both inside and outside of the classroom which helps determine educational outcomes. Student opinions of that process along with perceptions of outcomes are used to form student assessments of educational quality.

There are a number of practical reasons for evaluating from the student perspective both the process as well as the

outcomes of education. The first is that many pharmacy schools face a dwindling pool of applicants. The decreasing applicant pool forces schools to compete for students. If schools monitor student opinions, that information can be used to design more desirable professional programs that will enhance the school's image and encourage positive word-of-mouth by students and graduates. Another reason is to assess curricular changes associated with the adoption of the Pharm.D. as the sole professional degree. Funding for these curricular changes require schools to utilize their scarce resources as effectively as possible. Finally, the changing nature of pharmaceutical education requires that schools develop ways to examine the impact of educational methods over time. The move to problem-based learning methods and the promotion of pharmaceutical care requires that educators examine not only the outcomes of these methods but also the acceptability of the process.

What has been missing until recently is an instrument that assesses student perceptions of the quality of school facilities and both educational and non educational interactions with faculty and administration. To address this need, the following paper describes the adaptation and validation of an instrument from the services marketing literature that assesses pharmacy student perceptions of the quality of education provided by a pharmacy school. Since education is a service rather than a tangible product, the research was conducted using a service marketing framework which examines the quality of services from the consumer's viewpoint. Therefore, service quality in pharmaceutical education refers to student perceptions of the quality of their education. The service quality instrument developed in this research focuses primarily on the process of education but includes measures of perceived educational progress.

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*Am. J. Pharm. Educ.*, 65, 125-131(2001); received 8/8/00, accepted 2/2/01.

The objectives of this paper are to:

- develop a definition for Educational Service Quality based upon a review of the service marketing and educational literature;
- define the dimensions associated with Educational Service Quality;
- describe the development, administration, and validation of an instrument that assesses all of the dimensions of Educational Service Quality; and
- identify the relative importance of educational process and outcomes on students' overall assessments of the quality of pharmaceutical education.

### Defining Service Quality

Service quality assessment has received considerable attention in the marketing and health care literature(2-7). Its importance results from several major changes in the consumer marketplace including rising consumer expectations, technology advances, and escalating competition(8).

Service quality is defined in the marketing literature as a post-consumption evaluation of services by consumers that compares expectations with perceptions of performance(4). Service quality evaluations are based on the manner in which the service was delivered (*i.e.*, functional quality) and what outcome resulted from that service (*i.e.*, technical quality)(6). Although service quality is similar to consumer satisfaction, satisfaction differs because it is a transaction-specific construct. In contrast, service quality is operationalized as a cumulative evaluation of multiple transactions over time(4). Additionally, service quality addresses only issues of quality, while satisfaction may be made up of non-quality topics such as price.

The majority of service quality researchers have used the SERVQUAL service quality model(5-9). This model utilizes a 44-item measurement scale that compares differences between consumers' expectations of services and their assessment of the actual performance. The scale asks 22 questions relating to respondent expectations of excellent service of the type of service being evaluated. The expectation questions are followed by 22 matching questions rating actual performance of services provided. Five dimensions of service quality have been specified by SERVQUAL; reliability, responsiveness, empathy, assurance, and tangibles. Despite the popularity of SERVQUAL, numerous criticisms have been made which focus on the following points.

1. A five dimensional structure of service quality may not be appropriate for all services or in all situations(2-10).
2. Measuring expectations may be unnecessary to assess service quality. Performance measures alone may be superior both theoretically and practically(3,10-12).
3. Questions in the SERVQUAL instrument focus on the service process and not the outcome of that service(13).
4. The SERVQUAL instrument is too generic for many services to be used without alteration(2).

In partial response to the above criticisms, an alternative instrument has been utilized in service settings(3,10,14). This new instrument, called SERVPERF, retains the original 22 questionnaire items of SERVQUAL but measures only perceptions of performance instead of both performance and expectations. Its proponents argue that SERVPERF is shorter, theoretically

superior, and better reflects service quality assessments than SERVQUAL(10). The SERVPERF instrument has been validated for banking, pest-control, dry cleaning, fast food, advertising, and dental services(3,10,15,16).

### Defining Educational Service Quality

Educators in fields other than pharmacy have measured educational service quality for a variety of purposes(17-22). Service quality has been assessed as part of a total quality management program(19,23) to identify discrepancies between faculty and student assessments of education(23) and as a strategic tool for marketing education(17,20). The majority of this research has used the SERVQUAL instrument.

Although it has already been stated that consumer perceptions of service quality, in general, are determined by evaluations of both technical and functional quality(24), the SERVQUAL and SERVPERF instruments focus on measuring functional quality and only indirectly evaluate technical quality. Educators who rely on SERVQUAL or SERVPERF alone to assess student perceptions of educational quality accept a major premise of the service quality literature; that consumers rely on functional quality to evaluate service quality. The argument made for a "process-focus" is that consumers lack either the ability, information, or confidence to assess the technical quality of the services. Instead, they rely on functional quality assessments to signal the technical quality of services. For many services this premise may be true, but for higher education it may lack validity for two reasons.

The first reason is that educational services are highly involving and require high levels of participation unlike many other services such as fast food or grocery store services. Unless students are mentally involved and participate in their education, they cannot learn. During their participation and involvement in a four-year educational experience, students often develop strong opinions about their educational outcomes. These perceptions may not coincide perfectly with the true capabilities of students, but they should have some relationship with actual skills and knowledge(1).

The second reason is that there is evidence in the educational literature that pharmacy students use educational outcomes to evaluate the schools they attend. Fjortoft and Lee found student perceptions of their intellectual development (*i.e.*, an educational outcome which describes self evaluations of knowledge and skill gained and their relevance to student career goals) to be an important variable in student assessments of their school experiences(25). For these reasons, it is important that any instrument that assesses the service quality of pharmaceutical education should assess both technical and functional quality.

For the purpose of this study, educational service quality is defined as an attitude resulting from student perceptions of school performance regarding both functional and technical quality. Dimensions of educational service quality evaluated consist of the 10 service quality dimensions described by Parasuraman *et al.* in their original conceptual research(4) and an eleventh dimension of student perceptions of intellectual development as described by Fjortoft and Lee(25). Table I lists the dimensions of pharmaceutical education service quality, their descriptions, and the questions on the survey instrument used to assess each dimension.

### Development of the Service Quality Instrument

Development of a service quality assessment tool attempt

**Table I. Elements of educational service quality, element descriptions, and questionnaire items associated with each element**

Elements	Description
FUNCTIONAL QUALITY ( <i>i.e.</i> , process)	
Tangibles (Q1-Q6)	Assessments of the physical facilities, tools, and equipment used in educating the students ( <i>e.g.</i> , The pharmacy School's physical facilities are appealing).
Reliability (Q18, Q26)	Consistency and predictability in behavior ( <i>e.g.</i> , Faculty are consistent with their grading practices).
Responsiveness (Q7, Q8, Q24, Q28, Q29, Q37)	Willingness and ability to provide prompt service ( <i>e.g.</i> , Faculty are always willing to help you).
Communication (Q19, Q22, Q23, Q34)	Explaining service to students in language they can understand ( <i>e.g.</i> , Faculty explain things in a way you can understand).
Credibility (Q10, Q13, Q20, Q30)	Trustworthiness, believability, and honesty of student-contact personnel ( <i>e.g.</i> , Faculty keep their promises).
Security (Q11, Q12, Q31, Q32, Q33)	Confidentiality of transactions, freedom from doubt ( <i>e.g.</i> , Faculty are sensitive to student confidentiality).
Competence (Q15, Q16, Q17, Q36)	Knowledge and skill of student-contact personnel ( <i>e.g.</i> , Faculty are up-to-date with developments in their field).
Understanding-knowing the student (Q21, Q27)	Making an effort to ascertain a student's specific requirements ( <i>e.g.</i> , Faculty understand your specific needs).
Access (Q9)	Ease of contacting faculty ( <i>e.g.</i> , Faculty are available outside of class).
Courtesy (Q14, Q25, Q35)	Friendliness of student-contact personnel ( <i>e.g.</i> , Faculty treat you with respect).
TECHNICAL QUALITY ( <i>i.e.</i> , outcomes)	
Academic outcomes (Q38-Q41)	Intellectual progress ( <i>e.g.</i> , I am satisfied with my performance in School).

ed to capture all of the dimensions in Table I as well as make the following assumptions. The first was that educational service quality measures should be derived from the SERVPERF questionnaire(10) and supplemented by measures of perceived student educational progress. Another assumption was that the SERVPERF instrument is too generic for use in pharmacy education and requires some alteration and testing of its validity. A third assumption was that separate assessments should be made of both faculty and school administration performance. Previous survey experience and student discussions suggested that separating faculty and administration would reduce unexplained variance and provide better information upon which actions could be taken.

Carman recommends that modifications in service quality instruments are often necessary to make them appropriate for specific industries(2). Therefore the original 22 items in the SERVPERF instrument were increased to 38 items and reworded for educational services. The increase in items was primarily a result of duplicate questions differentiating faculty and pharmacy college administration performance. Modifications in the instrument were based on experience from previous unpublished research by one of the authors and other researchers(26). The 38 questions consisted of six items addressing learning resources in the college, 18 items about the faculty, and 14 items about School administration. These questions measured the functional quality of educational services. Four technical quality questions were added to the 38 functional quality questions of the SERVPERF questionnaire. Technical quality was operationalized as student perceptions of their educational development. Measures were taken from Fjortoft and Lee's study(25). A five-point Likert rating scale was used for the final 42-item Educational Service Quality instrument with choices "strongly agree," "agree," "somewhat agree," "disagree," and "strongly disagree." All questions were positively worded based on previous research that found no advantage in including a mix of positively and negatively worded items(9). Questions relating to personnel and facilities

of the University (*e.g.*, parking, financial aid, dormitory facilities) were not asked because these issues were outside of the control of the pharmacy school.

Additional questions were added to the survey relating to student demographics, School satisfaction, commitment to the Pharmacy School, and perceived value. School satisfaction consisted of four questions relating to satisfaction with teaching quality, faculty, administration, and curriculum. The five School commitment items were derived from Fjortoft and Lee(25) and addressed issues such as sense of School "ownership," identification with the School, and willingness to actively serve the School after graduation. Finally, a single question asked students if they felt that they got their money's worth at the School.

Face validity of the instrument was assessed by four faculty members of the school educational assessment committee and several pharmacy students. No measures to test for social desirability bias in the responses were included.

## METHODS

Subjects selected for this study were pharmacy students in their final year of school before graduation. These students were the first class of a new all PharmD curriculum and were approximately halfway through their one-year clerkship rotations. During an on-campus day, students were asked to complete a written survey evaluating various aspects of the pharmacy school. Eighty-five of the ninety students in the class were available to complete the survey. No attempt was made to determine if nonrespondents differed from those who completed the survey.

Relationships between demographic data and dependent variables were examined with simple regression analyses. Reliability of measures was calculated with Chronbach's alpha. Correlation and regression analyses were used to identify the relationships between educational service quality scales and criterion measures. All analyses of the collected data were conducted using SAS for Windows, Release 6.12.

## RESULTS

Subject demographic data is listed in Table II. The typical student was a female between the ages of 26 to 28 years old. Approximately one third of the students had a baccalaureate degree prior to entering pharmacy school, and all students had some previous experience with other educational institutions. No statistically significant relationships were found relating to gender, age, college education, degree, or grade point average with student evaluations of the resources, faculty, administration, or educational outcomes.

Mean scores and standard deviations are included for individual items in Table III. In general, there was moderate agreement with positive statements about the quality of educational services. The mean score of 2.21 out of a possible score of five showed the average perception of service quality was between 2 "agree" and 3 "somewhat agree" (note: lower scores indicate stronger agreement with statements). Responses were broadly distributed as indicated by the relatively large standard deviations and the fact that student answers ranged over at least four out of the possible five response categories of strongly-agree to strongly-disagree for all items except question 9 which ranged across three categories. The broad distribution of responses and exploratory statistical analyses using the Proc Univariate procedure from SAS for Windows Release 6.12 indicate that the data was not skewed, an occurrence common in consumer research which makes scores more difficult to interpret.

The reliability and construct validity of the Educational Service Quality scale was evaluated using criteria recommended by Churchill(27). Reliability was determined by conducting coefficient alpha analyses to assess the internal consistency of the individual items, sub-scales, and overall scale. Construct validity was assessed with correlational analyses of criterion variables.

Scale reliability is demonstrated in Table III. The overall coefficient alpha for the educational service quality scale is 0.97 indicating excellent internal consistency. Sub-scale reliabilities were 0.78 for learning resources, 0.93 for Faculty, 0.88 for Administration, and 0.80 for Technical Quality; all above the 0.7 recommended by Nunnally(28). All but two individual items had alpha coefficients above 0.5. Although item 3 ("Physical facilities convenient to students") indicated poor reliability, it was kept as part of the survey because of the importance of convenience to school administration. Further administrations of the survey will attempt to clarify the term "convenience" for students. An item dealing with student workload was dropped because of poor reliability and the fact that, in hindsight, it did not fall within any of the dimensions of service quality defined. This left 41 items in the Educational Service Quality Instrument.

Construct validity was assessed by examining the extent to which the 41-item scale correlated with measures of similar constructs and whether the measures behaved predictably(27). Correlations between educational quality constructs and criterion measures are shown in Table IV. Table IV consists of the service quality constructs Overall Service Quality (operationalized by the 41-item scale) and its two sub-scales Functional and Technical Quality. Functional Quality is further subdivided into Resources, Faculty, and Administration sub-scales. These educational quality constructs were correlated with the criterion constructs of "Overall Satisfaction," "Commitment to the School," and "Perceived Value" (described in the instrument development section of this paper).

**Table II. Demographic description of the surveyed students (n=85)**

Variable	N (percent)
Gender	
Female	61 (74.4)
Male	21 (25.6)
Age	
20-25	17 (20.7)
26-28	43 (52.4)
29-30	12 (14.6)
31-35	5 (6.1)
36 or older	5 (6.1)
Year in School Prior to Entering This School	
2 years	29 (35.4)
3 years	19 (23.2)
4 years	20 (24.4)
5 years or more	17 (20.8)
Bachelors of Arts or Science Degree Prior to entering this school	
Yes	29 (35.4)
No	53 (65.9)
Estimated Current GPA	
2.0-2.4	1 (1.2)
2.5-2.8	12 (14.8)
2.9-3.3	41 (50.6)
3.4-3.8	23 (28.4)
3.9-4.0	4 (4.9)

Sum totals of 85 may not occur due to nonresponses. Percentages are of those who responded.

Initially, there was concern about whether students would actually differentiate faculty from administration when evaluating the functional quality of the school. Two items were added to the instrument to test the discriminant and convergent validity of the faculty and administration portions of the Educational Service Quality instrument. The first single item question, "Overall, I am satisfied with the faculty of this school," was expected to correlate better with the multi-item faculty section of the instrument (labeled SERV FAC) than with the multi-item administration portion (labeled SERV ADM). Alternatively, the second item, "Overall, I am satisfied with the administration of this school," was expected to correlate better with SERV ADM than with SERV FAC. The results were as expected. The single item assessment of faculty correlated better with SERV ADM than with SERV FAC, ( $r = 0.73$  versus 0.6). Similarly, SERV ADM correlated better with the single item assessment of administration ( $r=0.8$  versus 0.56). Criterion validity was tested by evaluating the relationship of the 41-item Educational Service Quality instrument with criterion variables that should be associated with it. The literature indicates that the Educational Service Quality scale should correlate highly with overall satisfaction, commitment, and perceived value. Table IV indicates that responses to the scale correlate highly with all three constructs (satisfaction = 0.81, commitment = 0.68, and value = 0.63). Simple linear regression analyses with each of the criterion variables in Table IV showed the Educational Service Quality scale to explain 70 percent of Overall Satisfaction, 49 percent of Commitment to School, and 39 percent of Perceived Value.

A stepwise regression analysis was conducted to discover whether student perceptions of technical quality or functional quality were more important in determining overall satisfaction, commitment, and value perceptions. Three separate stepwise models were assessed with satisfaction, commitment, and

**Table III. Educational service quality instrument. Descriptive statistics and internal reliability for items (n=85)**

Item	Mean	SD	Alpha
<b>FUNCTIONAL (PROCESS) QUALITY</b>			
<b>Learning Resources - In General:</b>			0.78
1. Up-to-date teaching tools & equipment.	2.22	0.81	0.6
2. Physical facilities visually appealing & comfortable	2.36	0.78	0.61
3. Physical facilities convenient to students.	2.92	0.98	0.33
4. Electronic access to drug & health science information.	2.17	0.84	0.57
5. Computer laboratory an important asset.	2	0.96	0.56
6. Physical facilities readily available for use around-the-clock.	1.83	0.82	0.57
<b>Faculty - In General:</b>			<b>0.93</b>
7. Friendly & approachable.*	2.1	0.71	0.8
8. Willing to help you.*	2.05	0.66	0.8
9. Available outside of class.	2.2	0.65	0.73
10. Keep their promises.	2.18	0.81	0.73
11. Behavior instills confidence in students.*	2.4	0.87	0.68
12. Sensitive to student confidentiality.*	2.08	0.83	0.69
13. Honest with you.*	2.15	0.78	0.78
14. Treat you with respect.*	2.34	0.79	0.78
15. Have the knowledge to answer your questions.*	1.84	0.68	0.69
16. Are current with the developments in their area of expertise.	1.81	0.78	0.66
17. Know what topics are relevant to becoming a good pharmacist.	2.34	0.89	0.68
18. Consistent with their grading practices.	2.49	0.92	0.65
19. Explain things in a way that you can understand.	2.34	0.78	0.82
20. Have your best interests at heart.	2.34	0.75	0.79
21. Attempt to understand my specific needs.*	2.42	0.76	0.72
22. Make clear what they expect of you.	2.27	0.71	0.65
23. Usually give me adequate feedback about my performance.	2.49	0.76	0.62
<b>Administration - In General: Refers to personnel in Dean's and Dept. Offices</b>			<b>0.88</b>
24. Show sincere interest in solving student problems.	2.2	0.87	0.73
25. Friendly & approachable.*	2.09	0.81	0.8
26. Dependable.	2.13	0.88	0.87
27. Attempt to understand my specific needs.	2.27	0.95	0.88
28. Act promptly.	2.3	0.96	0.74
29. Willing to help you.*	2.18	0.87	0.9
30. Honest with you.*	2.16	0.93	0.85
31. Behavior instills confidence in students.*	2.35	0.98	0.78
32. Sensitive to student confidentiality.*	1.97	0.81	0.82
33. Sensitive to student safety.	1.95	0.77	0.76
34. Keep students informed about issues that concern them.	2.35	0.93	0.71
35. Treat you with respect.*	2.16	0.88	0.84
36. Have knowledge to answer your questions.*	1.92	0.72	0.81
37. Responsive to student evaluations about the curriculum.	2.54	1.1	0.68
<b>TECHNICAL (OUTCOME) QUALITY</b>			<b>0.8</b>
38. The school provided me with a high quality education.	2.13	0.8	0.64
39. I am satisfied with my intellectual development at this school.	2.2	0.98	0.68
40. I am proud of my accomplishments at this school.	1.94	0.93	0.65
41. I have performed as well academically as I anticipated I would.	2.29	0.91	0.51
<b>Total Service Quality Instrument (divided by total # items)</b>	<b>2.21</b>	<b>0.57</b>	<b>0.97</b>

\* Indicates items for faculty and administration match.

Notes: scales are 1 = strongly agree, 2 = agree, 3 = somewhat agree, 4 = disagree, 5 = strongly disagree. One item was dropped from the original 42 items.

**Table IV. Correlations between educational quality measures and criterion constructs**

	1	2	3	4	5	6	7	8	11
<b>Educational Service Quality Measures</b>									
1. Functional Quality (FQ) - 37 items	1								
2. Resources - 6 items	0.73	1							
3. Faculty - 17 items	0.9	0.6	1						
4. Administration - 14 items	0.9	0.56	0.66	1					
5. Technical Quality (TQ) - 4 items	0.72	0.53	0.67	0.61	1				
6. Overall Service Quality (FQ+TQ) - 41 items	0.97	0.73	0.9	0.89	0.78	1			
<b>Criterion Constructs</b>									
7. Overall Satisfaction - 4 items	0.81	0.52	0.73	0.74	0.84	0.84	1		
8. Commitment to School - 5 items	0.68	0.44	0.6	0.65	0.74	0.7	0.7	1	
9. Perceived Value - 1 item	0.63	0.43	0.51	0.59	0.66	0.65	0.69	0.63	1

Notes: 1. Functional Quality consists of the sub-scale items in 2., 3., and 4.

6. Overall Service Quality consists of the thirty-seven FQ sub-scale items in 1. and the four sub-scale TQ items in 5.

**Table V. Stepwise regression of technical quality and functional quality on satisfaction, commitment, and perceived value**

Dependent variable	Independent variable	Partial R <sup>2</sup>	P	Coefficient
Satisfaction	Technical Quality	0.708	<0.001	34.6
	Functional Quality	0.086	<0.001	3
Commitment	Technical Quality	0.535	<0.001	10.3
	Functional Quality	0.048	<0.003	3
Perceived Value	Technical Quality	0.467	<0.001	71.9
	Functional Quality	0.037	<0.016	6.1

value each acting as dependent variables for a model with the 37-item functional quality and the four-item technical quality measures acting as independent predictor variables. In all three models, both technical and functional quality had significant effects on satisfaction, commitment, and value (see Table V). However, technical quality had the greatest explanatory power for each of the three dependent variables with functional quality providing only a small amount of additional explanation of variance.

## DISCUSSION

The Educational Service Quality instrument described in this paper demonstrates reliability and validity in assessing pharmacy student perceptions of their education. Educational Service Quality scores explained significant amounts of student satisfaction, commitment, and perceived value. Since Educational Service Quality is so closely correlated with satisfaction, one might question whether it is actually measuring satisfaction rather than service quality.

Although service quality and satisfaction are considered to be distinct constructs, there are conditions when the difference may be indistinguishable. For services which consist of small numbers of discrete interactions between service providers and patrons, the difference may be important. However, in pharmaceutical education, the distinction between satisfaction and service quality may not be important because pharmacy degree programs are, by nature, a series of interactions extending over a considerable time period. Pharmaceutical education is not a discrete event similar to a visit to a convenience store or fast food restaurant. Education experiences occur numerous times each day over many years. Therefore, student evaluations are based on multiple transactions rather than a single one. In fact, Hampton suggests that satisfaction and service quality in university education may actually be the same construct, because satisfaction decays into service quality through multiple service experiences(21).

The findings of this study demonstrate that students rely more on evaluations of technical than functional quality when assessing pharmaceutical education. This conclusion should be accepted with some caution due to the significant collinearity between technical and functional quality. Collinearity between constructs means that the effect of one cannot be easily isolated from the other because outcomes affect perceptions of functional quality and vice versa. In education, student evaluations of educational progress will be influenced to some extent by the manner in which educational services are provided.

These research findings are limited by several factors. The study examined the responses of one P-4 class of students in a single geographic location. Conclusions relating the findings to other classes or geographic locations may not be valid. It is also unknown whether the findings are exclusive to pharma-

ceutical education or if they might also be applied to other forms of higher education. Future research might wish to compare the findings to other classes, schools, and disciplines. Research might also explore how student evaluations change as they progress through the different stages of pharmaceutical education.

Another limitation of this study is that the students surveyed were the first to complete a new PharmD program that replaced a BS degree program. These students were the first to go through a completely revamped curriculum and clerkship program. Since everything was new, there were more opportunities for mistakes, conflict, and disappointments. Student interaction with the school administration was also greater because more issues regarding new administrative rules and procedures needed to be addressed. For these reasons, it will be interesting to note how future student evaluations will change as a result of lessons learned from this class.

Several other questions might be answered by future research. Researchers might explore the dimensionality of pharmaceutical educational service quality. Parasuraman, Zeithaml, and Berry claim that the original 10 dimensions of service quality used in this research can be reduced to the five dimensions of reliability, responsiveness, assurance, empathy, and tangibles(9). A five dimensional structure has not been found consistently in other studies. Researchers might also attempt to use the Educational Service Quality instrument to segment students according to their service quality evaluations. If responses can be used to identify students who are committed to the school versus those who are not, actions might be taken to enhance loyalty to the school.

## CONCLUSION

Pharmaceutical education is difficult to evaluate because it shares features common of all services(4). The product and process of pharmaceutical education are intangible, variable, difficult to standardize, and require customer participation. Students receive knowledge, skills, experience, and perspective which cannot be seen, touched, felt, tasted, or touched unlike tangible products such as a textbook or a drug(7). Educational experiences vary with each lecture, laboratory session, and clerkship experience. Each experience is affected by so many variables that it is impossible to standardize the manner in which they are provided. Finally, pharmaceutical education requires that students participate in the educational process if learning is to occur.

Educational service quality, as defined by this paper, is assessed by the students. Although student assessments may not always reflect reality, they help determine important outcomes such as student participation in the classroom, involvement in extracurricular activities, and the image of the school that student carry with themselves upon graduation.

In their service marketing textbook, Zeithaml and Bitner discuss how students assess educational quality(7). They state that:

“Most students are in School to learn what they do not know. However, not knowing the subjects they are studying does not prevent them from making judgments about their professors. Cues such as the tangibles that accompany the service (overheads and other presentation materials), the professor’s appearance of nervousness, the degree of confidence communicated, or even whether the professor starts and ends class on time, are used to infer competence.”

Student perceptions of faculty significantly affect the manner in which students approach their school work. Student perceptions of faculty reliability, trustfulness, and communication have been found to affect student compliance and cooperation with faculty class assignments(29). If one takes the view that education is a cooperative venture between students and faculty, then understanding student perceptions of faculty may permit strategies to enhance student participation in their education in their learning.

Therefore, pharmacy schools should evaluate educational quality using multiple methods including service quality instruments. Pharmacy schools need to assess student perceptions of both the process and outcomes of their educational experiences. Systematic assessment over time can be used to identify the impact of major school initiatives and promote dialogue with students about the manner of their education.

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