INSTRUCTIONAL DESIGN AND ASSESSMENT

Implementation Of A Web-Based System For Obtaining Curricular Assessment Data

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Objectives. This paper describes the evaluation of a web-based assessment program for obtaining course, instructor, and program assessment data. Previously, the University of Colorado School of Pharmacy (SOP) used standard, bubble-sheet assessment forms that students completed during class at the end of each semester. Low response rates, loss of class time, and the potential for bias from self-selected responders led to the development of an online assessment system with revised instruments.
Methods. The assessment committee at the SOP developed assessment tools for individual courses and the overall program. These tools were used in an online system for all courses beginning fall of 2001. Student participation was mandatory; students not completing the forms online completed them in writing. Potential bias resulting from the mandatory participation policy was analyzed by comparing online responses with pooled online and written responses.
Results. For the 2001-2002 academic year, response rates ranged from 74% to 100%. Analysis of online and written responses revealed no observable bias from the written responses. Students described the online system as more user-friendly than the former system. The online format allowed timely dissemination of results to faculty and administrators. The major challenge was the administrative workload required to monitor responses and administer written assessments to noncompliant students.
Conclusion. The web-based assessment program provided complete and reliable course assessment data.

Keywords: assessment, teaching, technology, web-based.

INTRODUCTION

Student assessment of courses and instructors is a standard process used in higher education institutions, including schools and colleges of pharmacy. In a survey of 79 pharmacy schools, 72 schools indicated they used data from students in their assessment of faculty members' teaching skills.[1] These data are also used to provide feedback for improvement of instruction as well as help determine merit-based raises and promotion and tenure decisions.

Despite the widespread use of student perception data, a number of potential problems exist with the traditional data collection process. In a survey of deans and faculty at 126 medical schools in the United States, low response rates and inadequate sample sizes were frequently listed as a source of concern, primarily the result of voluntary participation policies.[2] Barnett and Matthews reported concerns on the part of pharmacy faculty about the administration of student assessments occurring at the end of a class period, leaving students little time to give much thought to the assessment instrument.[3] Grussing also reported problems with inadequate time for instrument completion and the lack of representativeness when student participation is low.[4] For team-taught courses, further problems are introduced when too much time passes between the time an individual instructor teaches their portion of the course and when

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that instructor is assessed by students at the end of the semester.[4,5]

Similar problems were encountered with the student assessment of courses and instruction at the University of Colorado School of Pharmacy. Prior to the 2001-2002 academic year, course assessments were conducted during class near the end of the semester using a handwritten format. Students were asked to complete the instructor, course, and program assessments using standard forms created by the university. Responses were electronically scanned and tabulated and the results were compiled and returned to faculty instructors and administrators. Students were not notified in advance that assessments would be conducted on a given date, and student participation was not mandatory. Faculty members were requested to complete self-assessments of their teaching and courses as part of the annual performance review process.

This traditional course assessment process proved to be problematic for a number of reasons. A major problem was that faculty members were required to forfeit class time for administration of course assessments, with minimal time allowed for the process. In addition, assessments for multiple courses were often administered simultaneously, further reducing the time for classroom activities. The lack of advanced notice to students that they would be completing an assessment and the time limitations imposed by the process led to lower participation and provision of fewer written comments from students. The relatively low response rates and the lack of time provided to complete the assessment generated concern about the quality of the data obtained from the system. Further, the low response rates led to faculty perceptions that student self-selection resulted in the collection of biased data that were subsequently included in the faculty members' professional portfolios and could potentially complicate their prospects for promotion.

From a logistical perspective, administration of the course assessment process was less than optimal. Electronic scanning of forms and compilation of results for distribution to the faculty often took months. By delaying dissemination of feedback to instructors, opportunities for improvement on the part of faculty members were minimized. Completion of self-assessments by faculty members that included their responses to student assessment instruments also was inconsistent, resulting in the collection of incomplete assessment data for those courses.

Upon initiation of the entry-level Doctor of Pharmacy (PharmD) curriculum in the fall semester of 1999, the school began the design and development of a comprehensive assessment system derived from its mission, goals, and strategic initiatives to help evaluate whether the curriculum was meeting expected outcomes. The perception of excessive and logistically burdensome course and program assessment demands placed on students and faculty resulted in concern with the effectiveness of the existing course assessment program. To address the challenges inherent in the process for course and program assessment, the school's Assessment Committee implemented a web-based program with the overall goal of obtaining course and program assessment data from students and faculty to improve individual courses and the program as a whole. The specific objectives in the establishment of the new system were as follows:

1. to develop assessment tools specific for different types of courses (ie, didactic, experiential, skills-based courses, and seminar courses) to be accessed through a web-based system to obtain course assessment data from students and faculty,

2. to develop and implement a policy ensuring 100% response rates from students and faculty, either through use of the online tools or through the completion of written assessment forms by students not accessing the online tools,

3. to evaluate the impact of pooling responses from students using the online system with responses from students using a written format, and

4. to conduct a review of the entry-level PharmD curriculum based on student responses obtained through the web-based assessment data collection system.

METHODS

The online program was developed by an outside vendor in collaboration with the campus Office of Education (OE) and Educational Support Services (ESS). This research was approved by the Colorado Multiple Institution Review Board.

Development of Assessment Tools

The Assessment Committee developed new assessment instruments for use in didactic courses, as well as in professional skills development, instructional methods, and seminar courses. A program assessment tool was also developed. Each assessment instrument was tailored to the course type, but all instruments included items about the perceived quality of course objectives, format, materials, instructional methods, examinations or other assessment measures, and course directors (see

Appendices 1-5). Course directors were asked to provide input in the instrument development process. Each statement on the assessment form was rated using a 5-point Likert scale where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree.

Online System Implementation

In the summer of 2001, the Assessment Committee conducted a trial of the online assessment program with students who were enrolled in the last 3 courses offered in the track-in PharmD program. Students in this program had previously earned their bachelor's degree in Pharmacy and were continuing in school to earn their PharmD. The pilot program yielded positive feedback concerning ease of use from students and faculty members in these courses as well as from the administrators responsible for implementing the assessment program, leading to the decision to implement the online assessment system in the 2001-2002 academic year for all courses except experiential courses.

Course and program assessment instruments were incorporated into the campus' web-based assessment program. Students logged into the system via a password-protected web site and had access only to those courses for which they were registered. "Open" and "close" dates were indicated for each assessment based on course end dates. Open dates allowing access to a course assessment began on the date a course finished. Access to each course assessment was closed 14 days later. During the 2-week window when a course assessment was accessible, students logged on to the web site, responded to each item by clicking on their selected responses (1 through 5), and had the opportunity to enter free-text comments. Forms could not be submitted until all items were answered; comments were not required. While a course assessment window was open, students could determine the completion status for that course. Once the assessment window for a course closed, students not completing the course assessment were notified by e-mail that they needed to complete the written assessment form.

The quality of the new system was measured in terms of response rates, subjective perceptions of quality, and analysis of potential biases introduced through mandatory participation. Online response rates were determined for each course and aggregate response rates for didactic courses were determined by class year (P1, P2 and P3 classes) for both the fall and spring semesters. Subjective evaluations of the online assessment program were sought from students, faculty, department chairs, and administrative personnel assigned to implement the system.

Mandatory Participation Policy

To avoid the potential for response bias resulting from student self-selection, the Assessment Committee instituted a mandatory participation policy. Although the system kept individual responses anonymous, student input could be tracked to allow identification of students not submitting completed online assessment forms. This feature allowed the Assessment Committee to enforce the mandatory participation policy. An administrative assistant working with the Assessment Committee tracked respondents. Students not completing online assessments were required to complete a written version identical to the online forms. The penalty for not completing the online or written assessments was prohibition from registering for classes the subsequent semester. This policy was reviewed and approved by university legal counsel.

A mandatory participation policy for faculty was also instituted. Data from the web-based system were retrieved electronically by the administrative assistant and distributed to individual instructors, course directors and department chairs only after receiving each faculty member's self-assessment forms. Submission of these reports was required of each faculty member as part of the annual review process; reports were withheld from any faculty member without completion of the same assessment forms completed by students.

The option of using a reward rather than punishment system to obtain a 100% response rate was discussed by the Assessment Committee. While a reward system seemed more palatable to the committee, identifying a reward system that would appeal to all students and faculty members proved difficult. Additionally, a reward system does not provide a mechanism for enforcement of the mandatory participation policy should a student or faculty member not respond to a particular reward. Therefore, the committee identified the consequences listed above for non-response on the part of students and faculty.

Analysis of Bias

As stated above, the former course assessment system generated concern about biased data resulting from low response rates and student self-selection. The policy of mandatory participation was instituted as part of the new system to achieve 100% response rates, yet it also introduced the potential of obtaining biased data through forced completion of handwritten instruments by non-compliant and, possibly, disgruntled students.

Table 1. Fall 2001 and spring 2002 online response rates by course type and class year.

Course Type	Class Year	Fall 2001 (%)	Spring 2002 (%)
Didactic courses			
	P1	84	100
	P2	92	90
	P3	85	100
Instructional methods/seminar courses			
	P1	92	100
	P2	92	97
	P3	90	100
Professional skills development courses			
	P1	92	100
	P2	94	73
	P3	87	86

While preliminary analysis of data from the summer 2001 pilot program suggested no differences in responses between online assessments and the mandated written responses from non-compliant students, fall 2001 course data were further analyzed to determine more definitively whether pooling the mandated written responses with responses obtained online might introduce bias. Data from the online program were compared with data obtained by pooling responses from both the online and written formats. Bias, defined as the difference between the means of the online and pooled data, was calculated for each item in each course. The bias was divided by the mean of the pooled online and written responses to derive the relative error (bias/pooled mean) for each question. The Assessment Committee used the relative error calculations as a measure of the reliability of the online data collection process, comparing online results to the pooled online and written responses.

RESULTS

Assessment Tool Development and Program Implementation

Assessment tools specific for didactic, Professional Skills Development, Instructional Methods, and Seminar courses (Appendices 1 through 4) and a Program assessment tool (Appendix 5) were developed by the Assessment Committee and posted on the web-based system. The system administrator accessed the item responses and online response rates electronically.

Anecdotal reports from students obtained throughout the semester and during focus group meetings indicated that the online assessment system was accessible and easy to use, and that students preferred the online system to the written format. The system allowed students to complete assessments in a private and unhurried environment. Students and faculty members appreciated the convenience of the online system especially because it did not interrupt classes and course assessment results were sent to instructors and course directors in a timely manner.

Administratively, the system proved extremely time consuming. Because all instructors and courses in the first 3 years of the program (except experiential courses) were included in the assessment process, more than 900 assessments had to be tracked through the system reports (3 reports are generated for each assessment; these include a statistical report, anonymous individual reports from each student, and comments). Every student who did not complete one or more of the assessments had to be identified, contacted, and provided with printed assessment forms to complete, a process that required additional tracking. A number of programming issues with the web-based system that needed to be resolved to improve the process also were identified.

Response Rates

Online response rates for the individual fall and spring courses ranged from 74% to 100% for all 3 classes in the PharmD program (Table 1). Overall responses for courses taught in the spring 2002 semester were higher than for those courses taught in the fall 2001 semester, a trend observed across all 3 years (P1 through P3) of the curriculum.

Online response rates were higher for courses ending at the end of the semester compared with courses ending mid-semester (data not shown). Eight of 9 courses that ended mid-semester had response rates

Table 2. Online mean, combined mean, bias and relative error for online compared with pooled data.[*]

| | P1 Didactic Courses | | | | P2 Didactic Courses | | | | P3 Didactic Courses | | | |
| n[†] | 464 | 533 | | | 425 | 448 | | | 264 | 299 | | |
Item[‡]	Online	Pooled	Bias[§]	RE[‖]	Online	Pooled	Bias[§]	RE[‖]	Online	Pooled	Bias[§]	RE[‖]
1	1.73	1.74	-0.02	-0.01	1.63	1.63	0.00	0.00	1.84	1.83	0.02	0.01
2	1.72	1.74	-0.02	-0.01	1.67	1.67	0.00	0.00	1.90	1.88	0.02	0.01
3	1.86	1.87	-0.01	-0.00	1.65	1.65	0.00	0.00	1.85	1.83	0.02	0.01
4	1.80	1.81	-0.02	-0.01	1.74	1.75	-0.01	-0.01	1.99	1.96	0.03	0.02
5	1.90	1.90	-0.00	-0.00	1.76	1.75	0.01	0.00	2.06	2.03	0.03	0.02
6	1.88	1.88	-0.00	-0.00	1.80	1.79	0.01	0.01	2.06	2.05	0.01	0.01
7	1.83	1.84	-0.01	-0.00	1.69	1.69	0.00	0.00	1.95	1.93	0.02	0.01
8	1.96	1.95	0.00	0.00	1.82	1.81	0.01	0.01	2.11	2.10	0.01	0.00
9	1.84	1.82	0.01	0.01	1.77	1.77	0.01	0.00	1.98	1.97	0.01	0.01
10	1.86	1.86	0.01	0.00	1.73	1.73	-0.00	-0.00	1.99	1.96	0.03	0.01
11	1.92	1.92	0.00	0.00	1.78	1.77	0.00	0.00	2.06	2.03	0.03	0.01
12	1.92	1.92	0.00	0.00	1.80	1.79	0.00	0.00	2.05	2.03	0.02	0.01
13	N/A	N/A	N/A	N/A	1.79	1.79	0.00	0.00	1.97	1.95	0.02	0.01
14	1.81	1.80	0.00	0.00	1.61	1.62	-0.01	-0.00	1.77	1.76	0.01	0.01
15	2.11	2.08	0.03	0.01	1.81	1.80	0.00	0.00	2.07	2.05	0.02	0.01
16	1.98	1.98	0.01	0.00	1.79	1.80	-0.01	-0.00	2.03	2.01	0.02	0.01
17	2.02	2.01	0.00	0.00	1.87	1.86	0.01	0.00	2.08	2.06	0.02	0.01
18	1.97	1.98	-0.00	-0.00	1.83	1.83	-0.00	-0.00	2.09	2.08	0.02	0.01
19	1.94	1.95	-0.01	-0.01	1.81	1.81	0.00	0.00	2.12	2.10	0.02	0.01
20	2.04	2.05	-0.01	-0.00	1.84	1.83	0.00	0.00	2.21	2.18	0.03	0.01
21	1.68	1.68	-0.01	-0.00	1.61	1.60	0.00	0.00	1.84	1.82	0.03	0.01
22	1.79	1.79	-0.00	-0.00	1.67	1.67	0.00	0.00	1.98	1.94	0.03	0.02
23	1.78	1.80	-0.02	-0.01	1.70	1.70	0.00	0.00	2.10	2.06	0.05	0.02
24	1.67	1.68	-0.01	-0.01	1.61	1.61	0.00	0.00	1.95	1.92	0.04	0.02
25	1.21	1.20	0.00	0.00	1.17	1.17	0.00	0.00	1.28	1.28	-0.00	-0.00

[*] results rounded to the nearest hundredth point; discrepancies are due to rounding

[†] n = number of students responding using online program and total number of students responding using either online or written method

[‡] Assessment items presented in Appendix 1

[§] Bias = (Online mean response) – (Pooled mean response)

[‖] RE = relative error (bias/pooled mean)

less than 90% (range 73% - 86%). In contrast, of the 31 courses that were completed at the end of semesters, only 4 had response rates below 90% (range: 85% to 89% percent). The mid- versus end-of-semester response rate pattern was observed for both fall 2001 and spring 2002 courses.

Analysis of Bias

The means for online and pooled (online plus written) data for didactic courses by class year (P1 through P3) are presented in Table 2 along with bias and relative error estimates. Due to the similarities in survey items for didactic courses within each year of the curriculum, data from didactic courses were combined by year for this analysis. The relative error calculations obtained from this analysis show that combining written and online data results in differences between 0 and ± 2% in the response means for pooled data compared with online data only (Table 2).

Results from individual courses were slightly more variable. A total of 345 items were used in assessment instruments administered in 14 didactic courses (Appendix 1). For the majority of the items (330 of the 345), combining online and written data resulted in a difference in response means between 0 and ± 2%. Combined means varied from online means by ± 3% for 11 items, by - 4% for one item, by ± 5% for 2 items, and by + 6% for 1 item (data not shown). For 47 of the 54 items administered in the 3 seminar courses (Appendices 3 and 4) combined means differed from online means by ± 2% or less, and by ± 3% or less for the remaining 7 items (data not shown). For 59 of the 60 items administered in 3 Professional Skills

Table 3. Range of Student Responses for Overall Program and Course Assessments by Course Type and Class Year, and Combined Faculty Response Means and Ranges[*]

Assessment Type	Class Year	Fall 2001	Spring 2002
Overall Program[†]			
	P1	1.9 - 2.6	1.6 - 2.1
	P2	1.6 - 2.1	1.7 - 2.0
	P3	1.6 - 2.0	1.7 - 2.1
Didactic Courses[‡]			
	P1	1.5 - 2.2	1.5 - 2.3[§]
	P2	1.4 - 2.0	1.6 - 3.4[‖]
	P3	1.5 - 2.6	1.4 - 2.1[¶]
Instructional Methods/Seminar Courses[‡]			
	P1	1.9 - 2.2	1.5 - 2.1
	P2	1.6 - 2.1	1.5 - 2.3
	P3	1.5 - 2.0	1.5 - 2.2
Professional Skills Development Courses[‡]			
	P1	1.7 - 2.2	2.0 - 2.8
	P2	1.9 - 2.4	1.6 - 2.3
	P3	1.9 - 2.1	1.6 - 1.9
Combined Faculty Responses[#]			
	Mean	1.5	1.4
	Range	1.0-4.0	1.0-4.0

[*] Scale: 1 = strongly agree; 2 = agree; 3 = neutral; 4 = disagree; 5 = strongly disagree.
[†] Program assessment items presented in Appendix 5.
[‡] Course assessment items presented in Appendices 1 through 4.
[§] P1 didactic - only one of 96 items scored a 2.3; range for remaining 95 items was 1.5 - 2.0.
[‖] P2 didactic - one course had a range of 2.1 - 3.4; responses for the other four courses had a range of 1.6 - 2.5.
[¶] P3 didactic - represents only elective courses; all core courses were non-didactic.
[#] Faculty responses combined from all courses and across all types.

courses (Appendix 2) combined means differed by ± 2%, and by + 4% for 1 item.

The low relative error calculations for individual courses and courses grouped by type demonstrate agreement between the online and pooled responses. This result demonstrates that minimal differences exist between online and written responses, and that the online responses represent an unbiased estimate of the total responses.

Response Means

Responses to individual items ranged from 1.4 to 2.6 across all fall 2001 courses, and from 1.4 to 3.4 across all spring 2002 courses (Table 3). For spring 2002 responses in the P1 didactic group, only 1 of 96 items scored a 2.3; the range for the remaining 95 items was 1.5 - 2.0. For spring 2002 responses in the P2 didactic group, 1 course had a range of 2.1 - 3.4; responses for the other 4 courses had a range of 1.6 - 2.5.

Faculty responses were combined over all courses delivered in the fall 2001 and spring 2002 semesters. Mean faculty responses and ranges are presented in Table 3. Overall PharmD program assessment tool responses ranged from 1.6 to 2.6 (Table 3).

DISCUSSION

During the academic year 2001-2002, the new online course and instructor assessment system worked well. In contrast to in-class course assessments, the system did not interfere with classroom activities and allowed students to complete assessments in a private and unhurried manner. Consistent with the reported ease of use and accessibility of the system, overall online response rates were high, ranging from 74% to 100% for individual courses. In contrast, response rates for the previous in-class written assessment process from the last 2 academic years for the PharmD program ranged from 36% to 96% (average of 68%), well below the online response rate.

The pattern of higher response rates for courses ending at the end of the semester compared with mid-semester was seen for fall 2001 and spring 2002 courses, suggesting mid-semester student participation in the online assessment program was lower than end-of-semester participation. The persistence of this pattern over the academic year indicates that student participation was not affected by additional experience with the program, and that lower mid-term response rates may be due to higher student workloads at that time of the semester.

The mandatory participation policy for course instructors and directors has provided additional data from the faculty perspective for use by the Assessment Committee in its ongoing evaluation of the curriculum. Mean faculty responses were consistent with student responses. Faculty responses covered a wider range than student responses, largely due to differences in the number of respondents. Each course typically has one director and 90 to 120 students, making it difficult to interpret these data.

The mandatory participation policy was instituted to eliminate potentially biased results from low response rates. The concern was also raised that the policy might encourage artificially low responses from disgruntled students being forced to complete written assessment forms when they missed deadlines for online participation, and inclusion of those responses might negatively bias the overall assessment of a course. The results of the analysis of potential bias, in which the online data were compared with the pooled (online plus written) data, indicate that mandatory student participation did not lead to biased results, and that written and online data could be pooled for review by faculty and administrators without introducing negative bias.

The results of the bias analysis should be evaluated in a step-wise fashion. First, pooling online and written responses does not result in biased data pursuant to the mandatory participation policy. The implication from this finding is that all available data can be used without raising questions of bias. Ideally, item responses from the online system would be merged with item responses from the handwritten assessments before distribution to faculty and administration. Comments from both systems would also be combined and distributed. This approach would lead to consideration of responses from all students when evaluating faculty teaching and courses as part of the annual performance review or during promotion deliberations.

The second finding is that the online results represent an unbiased estimation of the views of all students enrolled in the class. The implication from this result is that in the event that pooling item responses from online and handwritten assessments is logistically prohibitive, use of the online results alone can be used without raising questions of bias. Comments from both systems would again be combined. This approach would lead to the consideration of unbiased, representative responses from students participating in the online system along with comments from all students when evaluating faculty teaching and courses as part of the annual performance review or during promotion deliberations. The practice of administering the more time-consuming handwritten assessments to non-compliant students is still deemed necessary in that it provides the incentive for students to participate in the user-friendly online system.

A third implication regarding the finding of lack of bias in online versus pooled responses is that a portion of students enrolled in a class could potentially be sampled to determine the views of the entire class. Sampling one half or one third of each class would require students to participate in assessments for 1 of every 2 or 3 courses rather than for every course and every instructor. The presumed advantage of this type of system would be that by requiring students to complete fewer assessments, they would be likely to spend more time on each assessment. With more time, students would be able to provide more extensive comments about each class. By giving the students fewer assessments to complete, there would be a higher likelihood that appropriate student attitudes toward the assessment process could be maintained, resulting in the collection of higher quality data. Investigations into the impact of sampling are currently underway.

Students rated most courses in the curriculum and the overall PharmD program highly. In the few instances

where student assessments were not as positive, steps are being taken to determine the cause for the lower ratings. While student perception data alone may not be appropriate to initiate course changes, results from one course assessment performed during the 2001-2002 academic year were used by the Curriculum Committee to support a faculty proposal for redesign of that course.

There was a tendency for students to view performance-based courses (eg, skills-based courses) more highly in later compared with earlier years of the curriculum. One possible interpretation of these results is that it takes a period of time for students to gain an appreciation for the development of professional skills and the beneficial role these courses play in that process.

CONCLUSIONS

The online student course and instructor assessment program provides an opportunity to collect data that is more representative of student perceptions, does not interfere with classroom activities, allows students sufficient time to respond appropriately, and provides a mechanism for delivering results to faculty and administrators in a timely manner. Each of these attributes offers significant advantages over the for-mer standard written classroom course and instructor assessment forms that were completed during class time. The possibility of developing a sampling system strategy adds to the overall benefits of the online course and instructor assessment system.

Overall, the new PharmD curriculum can be judged successful based on perception course assessment data gathered from students and faculty members using a web-based system. Comprehensive evaluation of the curriculum will require linking these perception data with other assessment results, including objective measures of student achievement of program outcomes.

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Appendix 1. Didactic Course Assessment Instrument

Scale: Strongly Agree   Agree   Neither Agree/Disagree   Disagree   Strongly Disagree

<u>Course objectives . . . .</u>
1. . . . were presented clearly in the course syllabus
2. . . . were explained clearly at the beginning of the course
3. . . . were directly related to lectures or other instructional activities
4. . . . were directly related to graded exercises (exams, assignments, etc.)
5. . . . helped me identify important concepts and principles in the course

<u>Course structure and format . . . .</u>
6. . . . were well organized
7. . . . were described adequately in the course syllabus
8. . . . facilitated my learning in the course

<u>Course texts, handouts, syllabi, etc. . . . .</u>
9. . . . were well organized for use in the course
10. . . . helped me learn the course material

<u>Course content . . . .</u>
11. . . . was organized in a manner that helped me learn
12. . . . was provided in a logical sequence
13. . . . built upon material in previous courses
14. . . . was relevant to the practice of pharmacy or delivery of health care

<u>Instructional methods (e.g., lectures, discussions, group activities) . . . .</u>
15. . . . stimulated my interest in the subject
16. . . . helped me learn the course material
17. . . . helped me prepare for graded exercises (exams, quizzes, etc.)

<u>Graded exercises (e.g., assignments, exams, performance assessments, etc.) . . . .</u>
18. . . . helped me learn the course material
19. . . . were consistent with the content or skills taught in the course
20. . . . reflected the time spent on the subject matter presented in the course

<u>Course director(s) . . .</u>
21. . . . clearly informed the students about the manner in which (s)he can be contacted
22. . . . were accessible to students throughout the course as stated in the syllabus
23. . . . addressed student concerns during the course
24. . . . interacted with students in a professional manner

<u>Pace of instruction . . .</u>
25. The pace of instruction in this course was . . .
    too fast
    about right
    too slow

Appendix 2. Skills Course Assessment Instrument

Scale: Strongly Agree   Agree   Neither Agree/Disagree   Disagree   Strongly Disagree

Clarity of purpose:
1. The purpose of this course was clearly explained.
2. The outcomes of this course were clearly explained.

Instructional activities:
3. The instructional activities used in this course (group discussions, hands-on activities, SOAP noting, physical assessment, standardized patients) contributed to my learning about the practice of pharmacy.
4. The activities in this course helped me better comprehend the connection between health sciences and pharmacy practice.
5. Activities in the course were helpful in raising my awareness of professional behavior, attitudes and ethical expectations relevant to pharmacy practice.

Course content:
6. The course content was organized in a manner that helped me learn the course material.
7. The materials necessary for me to complete assigned tasks were made available.
8. This course complemented what I learned in other courses.
9. Work inside and outside of class time was reasonably well balanced.

Student performance:
10. As a result of this course, I am developing the ability to communicate more clearly.
11. As a result of this course, I am developing the ability to solve pharmacy-related problems.
12. Graded exercises accurately assessed my performance.
13. Feedback regarding my performance was helpful towards improving future performance.

Course directors:
14. The course directors were accessible as stated in the syllabus.
15. Course directors addressed student concerns during the course.
16. Course directors interacted with students in a professional manner.
17. Comment on whether the course was appropriately challenging.
18. Comment on what topics or skills you consider to be absent from the course and would like to see included.
19. Comment on aspects of the course that the directors should consider revising or eliminating.
20. Comment on the sequence of activities in the course.

Appendix 3. Instructional Methods Course Assessment Instrument

Scale: Strongly Agree   Agree   Neither Agree/Disagree   Disagree   Strongly Disagree

Course objectives . . . .
1. . . were clearly presented in the course syllabus.
2. . . were clearly explained at the beginning of the course.

Course content . . . .
3. . . . was organized in a manner that helped me learn.
4. . . . was directly related to the goals and objectives of the course.
5. . . . was made relevant to pharmacy.

Instructional methods (lectures, observation of other presentations) . . . .
6. . . . enhanced my knowledge about effective presentation skills.
7. . . . were appropriate for achieving the goals and objectives of the course.
8. . . . stimulated my interest.

Exercises and activities . . . .
9. . . . were graded objectively.
10. . . . helped me achieve the course objectives.
11. . . . provided opportunities to apply what was learned.
12. . . . provided valuable feedback to improve future performance

Student performance:
As a result of this course, I improved my ability to . . .
13. . . . organize a presentation.
14. . . . make audiovisual aids.
15. . . . deliver a presentation.
16. . . . objectively evaluate a presentation.

Course director(s) . . .
17. . . . clearly informed the students about the manner in which (s)he can be contacted .
18. . . . were accessible as stated to students throughout the course.
19. . . . addressed student concerns during the course.
20. . . . were respectful.
21. . . . were helpful and approachable.

Appendix 4. Seminar Course Assessment Instrument

Scale: Strongly Agree   Agree   Neither Agree/Disagree   Disagree   Strongly Disagree

<u>**Course objectives . . . .**</u>
1. . . were clearly presented in the course syllabus.
2. . . were clearly explained at the beginning of the course.

<u>**Exercises and activities . . . .**</u>
3.. . . were graded objectively.
4.. . . helped me achieve the course objectives.
5.. . . provided opportunities to apply what was learned.
6.. . . provided valuable feedback to improve future performance.

<u>**Student performance:**</u>
<u>**As a result of this course, I improved my ability to . . .**</u>
7. . . . organize a professional presentation.
8. . . . make audiovisual aids appropriate for a professional presentation.
9. . . . organize a handout to enhance a presentation.
10. . . . deliver a professional presentation.
11. . . . objectively evaluate a presentation.

<u>**Course director(s) . . .**</u>
12. . . . clearly informed the students about the manner in which (s)he can be contacted .
13. . . . were accessible to students throughout the course.
14. . . . addressed student concerns during the course.
15. . . . were respectful.
16. . . . were helpful and approachable.

Appendix 5. Program Assessment Instrument

Scale: Strongly Agree   Agree   Neither Agree/Disagree   Disagree   Strongly Disagree

1. Overall, I recognize how this semester's courses relate to each other in helping to build a foundation of pharmacy knowledge and skills.
2. This semester's curriculum helped me develop professional attitudes and behaviors needed to meet my responsibilities as a pharmacist.
3. Overall, I am satisfied with the organization of the curriculum this semester.
4. The School of Pharmacy environment (curriculum, extracurricular activities, student organizations, interactions with students, faculty and staff) helps to develop my sense of professionalism.