

# Expansion of Ability-Based Education Using an Assessment Center Approach with Pharmacists as Assessors<sup>1,2</sup>

Dana L. Purkerson, Holly L. Mason<sup>3</sup>, Robert K. Chalmers, Nicholas G. Popovich, and Steven A. Scott

*Department of Pharmacy Practice, School of Pharmacy and Pharmacal Sciences, Purdue University, West Lafayette, IN 47907-1335*

Schools of Pharmacy are making efforts to incorporate ability-based educational outcomes into curricula. This paper describes expansion of such a project at one university over the period of Spring 1994 to Spring 1997. The initial project focused on using an assessment center approach to assess thirty-two, volunteer, second-professional year students on four ability-based outcomes in Spring 1994. Expansion of this project the following year included gearing up to assess the entire class of second-professional year students on the same four outcomes: group interaction, problem-solving, and both written and interpersonal communication skills. A three-hour Integrated Abilities Seminar served as the format for assessment and included individual feedback for the students on their performances. To assess a large number of students during Spring semester 1995, volunteer pharmacists were recruited and trained to serve as assessors. Attitudinal data from students and volunteer pharmacist assessors demonstrated positive response to the Integrated Abilities Seminar experience. Expansion of the initial project also included reassessment of twenty-seven of the original thirty-two students in Fall 1995, during their fourth professional year. Reassessment mean scores on two exercises significantly improved from the students' original scores. A version of the Integrated Abilities Seminar was a module for all first-professional year PharmD students in an Integrated Laboratory course during Spring 1997. This assessment approach may be of great value to supplement conventional evaluation techniques in helping students to develop professional outcome abilities. This project also demonstrates successful involvement of local pharmacists in academic-based activities.

## BACKGROUND

Many schools of Pharmacy are revising their curricula to better prepare graduates to practice successfully in a changing profession. Curricular revisions are incorporating recommendations from the American Association of Colleges of Pharmacy's (AACP) Commission to Implement Change and guidelines from the American Council on Pharmaceutical Education (ACPE)(1,2). More specifically, many schools are implementing ability-based curricula and assessment programs to help teach and evaluate, respectively, students' development of the knowledge, skills, and abilities necessary to provide pharmaceutical care.

This paper describes four developmental phases (to date) of a project, the Integrated Abilities Seminar, that operationalizes the concept of an assessment center. The purpose of this workshop-type seminar is to assess pharmacy students' growth and achievement toward four ability-based outcomes. The goal is for all classes of students to participate in the seminar at three points in their professional curriculum: entry into the program, midpoint (second or third professional year), and exit (final year). This plan would enable documentation of students' development of ability-based outcomes as well as provide formative feedback to students regarding their strengths and weaknesses related to the four abilities.

A previous paper thoroughly described the initial pilot project, (Phase I, Spring 1994) and provided a comprehensive literature review(3). This phase is summarized briefly in this paper as well to provide a context for the following phases. Phase II (Spring 1995) was the expansion and implementation of the seminar for an entire class of students and

utilized local pharmacists as volunteer assessors. Phase III (Fall 1995) involved reassessing twenty-seven of the original thirty-two students from the pilot project. Phase IV (Spring 1997) was similar to Phase II except a modified version of the seminar was incorporated into a new core course for Doctor of Pharmacy students, the Integrated Laboratory.

## PHASE I

In the Spring Semester 1994, a pilot project was undertaken to explore the effectiveness of an assessment center approach for evaluating students' ability-based educational outcomes. The project had thirty-two second professional-year student volunteers participate in four performance-based exercises in a three-hour workshop, termed the Integrated Abilities Seminar. Students were divided into eight groups of four students; each workshop involved one group at a time. The workshop was independent of any course and was held outside of scheduled class time. Each exercise demonstrated one of four ability-based outcomes: (i) group interaction, (ii) decision-making and time management aspects of problem-solving, (iii) writing skills, and (iv) interpersonal communication. Students were assessed by trained faculty members during the workshop and assessed their own performances at the conclusion. Some exercises were videotaped; the videotapes and print-based exercises were

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<sup>3</sup>Corresponding author

assessed the week following the workshop. When the assessments were complete, students were given individual mentoring feedback which incorporated both faculty and students' comments. Mentoring feedback from the assessors helped students analyze their performances on the exercises and emphasized strategies to help them strengthen their weak areas.

Data included students' demographics, scores on the exercises, and attitudes toward the workshop and feedback processes. Students' mean performance scores on the four exercises met or exceeded faculty expectations, ranging from 3.35 to 3.71 (5 = Student was consistently effective and demonstrated excellent skills in this area, 3 = Student was generally effective and demonstrated satisfactory skills in this area, 1 = Student was inconsistent or demonstrated deficient skills in this area). Students' mean attitude scores were positive, ranging from 3.09 to 4.91 (5 = strongly agree, 1 = strongly disagree) on a series of twenty-four items. Reliability of the assessment instruments was shown by a range of Cronbach's alpha coefficients across instruments from 0.85 to 0.92. Three of four exercises had statistically significant Pearson's correlation coefficients across assessors, thus establishing inter-rater reliability for those exercises. Content validity was established by an expert panel of faculty assessors who aided in development of the project. The validity of this assessment approach is also supported by the history of successful use of assessment centers in the corporate world and higher education(4,5).

#### PHASE II: FALL 1994 AND SPRING 1995

Upon successful completion of the pilot project, the Integrated Abilities Seminar was expanded the following year to include the entire second-professional year class of 160 students. Several recommendations resulting from the pilot project needed to be implemented before this could occur: (i) students should assess themselves immediately after each exercise and receive mentoring feedback from the assessors soon after self-assessment was completed; (ii) the problem-solving assessment instrument needed some revision for clarity; (iii) more assessors and additional space were needed to accommodate two or three groups per seminar with four to six students per group; and (iv) exercises should be abbreviated to allow time for mentoring feedback at the conclusion of the seminar (rather than having students return at a later time).

#### Recruitment and Training of Assessors

One of the most unique features of Phase II and the subsequent phase was the involvement of practicing pharmacists in this interactive educational project based at the School of Pharmacy. Many schools and colleges of pharmacy utilize pharmacists in the "classroom" as guest lecturers as well as preceptors for students involved in externship and clerkship rotations. Very little literature exists, however, regarding pharmacists participating with students in non-lecture educational methods/formats at schools or colleges of pharmacy. The need for more active and stronger relationships between education and practice has been discussed(6,7). In fact, this partnership was the theme for the 1995 American Association of Colleges of Pharmacy Annual Meeting(8).

For Phase II implementation of the Integrated Abilities Seminar, pharmacists were recruited as volunteer assessors from the local pharmacy association membership. These

pharmacists were selected from a variety of practice settings: independent, chain, institutional, consultant, home health care, and industry. More pharmacy practice faculty also were recruited to serve as assessors. In addition, graduate students in the Department of Pharmacy Practice were scheduled to serve as assistants to the assessors as part of their semester teaching assignments. A total of thirteen pharmacists, seven faculty, and four graduate students served as

assessment center personnel during the semester. Each seminar involved two or three groups of students and utilized between four and six pharmacist and faculty assessors and three or four graduate assistants. Thus, assessors and assistants were not required to attend every seminar; they rotated on a weekly basis.

A four-hour training workshop for all assessors and assistants was developed and held two weeks prior to the first seminar for students. Two of these training workshops were held on the same day to accommodate pharmacists' varying schedules. The agenda for this workshop is shown in Appendix A.

#### Student Scheduling

Although participation in the Integrated Abilities Seminar was neither a course nor graduation requirement for students, a one-time seminar time-block was printed on each students' semester schedule by the Registrar's Office as PHPR 909. Students already had a three-hour time block in their schedules to allow for a one-time participation in the Glaxo Career Pathway Program(9). This program was scheduled every other week, so the Integrated Abilities Seminar was offered on alternate weeks. A total of 154 students were randomly assigned to one of eight Integrated Abilities Seminar timeblocks over the course of the semester. In addition, four evening sessions were scheduled to accommodate those students who were unable to attend during their scheduled day.

A reminder letter was sent to students a week prior to their scheduled seminar. The letter explained the workshop and the importance of their attendance. A seminar agenda was also included in the mailing. Students were not asked to bring any materials, although it was explained that they might have to wait a few minutes at the end of the seminar before they received their individual feedback.

Seminar attendance ranged from six to eighteen students per session. Prior to each seminar, the project coordinator randomly assigned that session's students into one of three groups. Two assessors were randomly assigned to each group; they were then randomly assigned to either two or three students within the group (depending on the number of students in the group). Accurate allocation of assessors to students was crucial for the success of the workshop. If the ratio of assessors to students was more disproportionate than 1:3, there would have been too many students to assess with the number of assessors present. Conversely, it was better to have too many assessors and not "enough" students. If the ratio of assessors to students approached 1:1, students had a greater level of individual attention from their assessor.

#### Seminar Procedures

The day of their scheduled seminar, students and assessors reported to their assigned classrooms (refer to Appendix B for a schematic of the assessment sessions). Each room

had a facilitator who would direct the assessors and students through the seminar's activities. After students and assessors had arrived, the facilitator introduced the workshop and had the assessors and students introduce themselves. A script was used so that each facilitator was consistent in presentation. Facilitators included the project coordinator, who attended every seminar, a faculty member and an undergraduate research assistant. Because only one or two facilitators were needed for each session (depending on the number of students participating), the latter two facilitators rotated seminars on a weekly basis. Each student and assessor received a name tag and a packet with an agenda, color-coded assessment forms, notebook paper and a pencil. The assessment forms used by students and assessors were identical.

After a brief overview of the workshop's activities, the facilitators distributed the problem-solving "in-basket" exercise to the students. This exercise utilized students' decision-making and time management aspects of the problem-solving ability and was described previously(3). The in-basket exercise created for the Phase I pilot project had twelve separate tasks, although two tasks were combined with other tasks for a total of ten items on the original problem-solving assessment instrument. This exercise was reduced from twelve tasks and 60-minute time limit in Phase I to ten distinct tasks and a 45-minute time limit for use in Phase II. In the 45-minute period, students were instructed to fill out task planning forms on which they described the following for each task: how and when they planned to handle the task during the subsequent work week; why they chose to do it that way; and what additional information they would need and how they planned to retrieve that information. In addition, they were to complete a calendar grid on which they would schedule the tasks during that week and briefly describe their overall strategy for handling the in-basket exercise. An enhanced version of this exercise has been published elsewhere(10).

While the students started on the in-basket exercise, the assessors prepared for the interpersonal communication exercise. A pharmacist/patient counseling scenario was created that reflected an enactment of one of the problem-solving tasks from the in-basket exercise. The facilitators had one student at a time from each group leave the in-basket exercise temporarily to participate in the role-play exercise. Students were given a "patient profile" at this time which briefly described the patient and his/her fictitious medicines. Each student had a minute or two to review the profile before being led to a separate room where his/her assessors were set up. Students were allowed to keep the profile with them during the counseling session. The patient (assessor #1) presented him/herself to the pharmacist (student) as an elderly, somewhat confused patient with a "brown" bag of simulated prescription medicines from several different pharmacies. The goal for the "pharmacist" was to help the "patient" become more compliant. The other assessor (assessor #2) unobtrusively observed the interaction and assessed the student using the Interpersonal Communication Assessment Instrument<sup>4</sup>. The session was concluded after ten minutes even if the student had not finished counseling. This was determined to be an adequate amount of time for the assessor to evaluate the student on

ten interpersonal communication attributes. The student then returned to complete the in-basket exercise and another student participated in the role-play.

Sixty minutes were allotted for students to complete both the in-basket and role-play exercises. At the end of this time, the facilitators collected the students' "out-baskets" and had the students complete the Problem-solving and Interpersonal Communication Assessment Instruments on themselves. When these were completed, students were given a ten minute break. The facilitators then distributed the completed in-basket materials to the assessors. Each pharmacist or faculty assessor was given only one of his/her assigned student's exercise to assess. This was done because each student's exercise took between 20-30 minutes to assess using the Problem-solving Assessment Instrument; assessors only had enough time to complete one of these during the course of the workshop. The remainder of students' exercises were distributed to the graduate assistants. These graduate students worked "behind the scenes" on the paper-based assessments and did not come into direct contact with the students.

After the students' brief break, they reassembled in their groups seated around a table to begin the group interaction exercise. Pharmacist and faculty assessors positioned themselves around their respective groups so that they could observe and assess their assigned students as unobtrusively as possible. The facilitators handed each student a sheet that explained the group interaction scenario and contained plausible questions to help guide the group's discussion. The scenario asked the group of students to act as citizen (not necessarily pharmacist) members of the County Community Health Board. The County Commissioners charged the Board with raising the number of DTP immunized children in the county up to standards provided by the Center for Disease Control and Prevention. The students were allowed five minutes to read over the scenario before the fifteen-minute discussion would begin (discussion time was reduced to fifteen minutes from a thirty-minute allotment in the original seminar; this was done not only to abbreviate the seminar, but fifteen minutes was determined by the assessors to be an adequate period of time to assess students' group interaction abilities). Students were encouraged to take brief notes for their own benefit if they desired (see description of writing exercise, below). During this time, graduate student assistants continued their assessments of students' problem-solving exercises.

At the end of the allotted fifteen minutes, discussion was ended by the facilitator and students assessed themselves using the Group Interaction Assessment Instrument. When these were completed, each student was handed a sheet that described the written communication exercise. This assignment was created to assess each student's extemporaneous writing ability as evidenced without the opportunity for revision. Each student was given twenty minutes to write individual informal reports as a "board member" to the County Commissioners, one to one and one-half pages long, that described the plan the group had developed. They were also asked to comment about the process by which the "Board" worked together as a group. Although not directly assessed in this exercise, this was done to enhance the subjects' awareness of the importance of effective group interaction skills. During this time, assessors returned to their "rooms" (where the role-plays occurred) to complete

<sup>4</sup>Copies of all assessment instruments are available from the corresponding author.

their student's in-basket assessment.

When twenty minutes had expired, students' reports were collected by the facilitators and distributed to the assessors and graduate assistants in the same fashion as had been previously done for the in-basket assessment. Assessors were given ten minutes to complete the written report assessments; the Written Communication Assessment Instrument contained eight attributes upon which students' writing was rated. Meanwhile, students completed their written communication self-assessments and the post-assessment session portion of an attitude reflection survey.

When students and their respective assessors were ready, individual feedback sessions began. Each student met with his/her assessor for approximately ten to fifteen minutes. During the feedback session, the assessor and student compared their assessments for each exercise and discussed their respective rationale for each rating. With regard to completing the assessment forms, assessors had been instructed to provide written comments for criteria where students rated other than a "3" (3 = Student was generally effective and demonstrated satisfactory skills in this area). Assessors provided students with constructive and encouraging comments as appropriate, and also discussed "real world" examples where effective use of the assessed abilities were important. At the conclusion of the feedback session, students completed the post-feedback portion of the attitude reflection survey and handed in all materials to the facilitator.

#### Data Collection and Analysis

A total of 139 second professional year students participated in twelve Integrated Abilities Seminar sessions, a class participation rate of 90 percent. Demographic information on these students was not collected. Students were returned their assessment forms at the end of the workshop to put in their portfolios<sup>5</sup>. All attitude surveys were collected and subsequently analyzed.

Descriptive frequencies were run on the attitude data using the Statistical Analysis Software (SAS) program and are presented in Table I. A general linear models procedure and Duncan's test were run to determine if any significant differences between sessions existed when analyzed by mean scores of the attitudinal items. Using a probability level of  $P < 0.05$  for all statistical tests, no differences were found.

At the end of the semester, all assessors were invited to an informal dinner meeting to discuss the seminars and to complete an Assessor Attitude Survey. The survey consisted of a series of statements almost identical to the student attitude assessment survey; assessors were also asked to rate, their level of agreement with each of the statements based on a Likert scale. Descriptive frequencies were obtained on the data using the Statistical Package for the Social Sciences (SPSS-X) and are presented in Table II. In addition, assessors were asked to complete a survey of open-ended questions such as, (paraphrased) "was the initial training workshop adequate to prepare you as an assessor?" "how could we improve the format of the sessions?" "how could each exercise be improved?" and "how could we improve the 'use' of the assessors?"

**Table I. Phase II mean responses on student attitude assessment survey items<sup>a</sup>**

Survey item	Mean(SD) <sup>b</sup>
1. The group interaction exercise increased my awareness of the need to possess effective interaction skills.	3.81 (0.66)
2. The writing exercise increased my awareness of the need to possess effective written communication skills.	3.70 (0.74)
3. The problem-solving exercise increased my awareness of the need to possess effective problem-solving skills.	4.19 (0.78)
4. The role-playing exercise increased my awareness of the need to possess effective interpersonal communication skills.	4.12 (0.79)
5. The group interaction exercise was appropriate to help me understand how I really act in this kind of group activity.	3.61 (0.86)
6. The writing exercise is an appropriate indicator of my true writing ability.	3.55 (0.83)
7. The problem-solving exercise provided an appropriate means to assess my ability to solve problems in those kind of situations.	3.71 (0.90)
8. The role-playing exercise provided an appropriate means to assess my ability to communicate in similar situations.	3.79 (0.81)
9. I felt I was able to accurately assess my group interaction skills using the corresponding assessment form.	3.70 (0.64)
10. I felt I was able to accurately assess my written communication skills using the corresponding assessment form.	3.60 (0.63)
11. I felt I was able to accurately assess my problem-solving skills using the corresponding assessment form.	3.61 (0.72)
12. I felt I was able to accurately assess my interpersonal communication skills using the corresponding assessment form.	3.77 (0.60)
13. The assessors were accurate in their assessment of my group interaction skills.	4.10 (0.51)
14. The assessors were accurate in their assessment of my writing skills.	3.74 (0.90)
15. The assessors were accurate in their assessment of my problem-solving skills.	3.68 (0.84)
16. The assessors were accurate in their assessment of my interpersonal communication skills.	4.09 (0.55)
17. I understand how these abilities (group interaction, problem-solving, written and interpersonal communication skills) are important in my development as a health care professional.	4.38 (0.52)
18. This study has helped illustrate the important interrelationship of these abilities in my overall development as a health care professional.	4.11 (0.59)
19. I am now more aware of my strengths and weaknesses regarding the four assessed abilities.	3.91 (0.83)
20. I believe development and improvement of the skills assessed is important for me to work on to become an effective health care professional.	4.30 (0.51)
21. I feel that participating in this project was a worthwhile experience.	3.94 (0.77)

<sup>a</sup>5 = strongly agree; 4 = agree; 3 = undecided; 2 = disagree; 1 = strongly disagree.

<sup>b</sup>N ranges from 129-135 due to missing responses.

<sup>5</sup>Students are encouraged to keep an ongoing portfolio of unique activities and projects during their years in the professional pharmacy program.

**Table II. Phase II mean responses on assessor attitude assessment survey items<sup>a</sup>**

Survey item	Mean (SD) <sup>b</sup>
1. The problem-solving exercise provided an appropriate means to assess students' ability to solve problems in those kind of situations.	4.04 (0.64)
2. The interpersonal communication role-play exercise provided an appropriate means to assess students' ability to communicate in similar situations.	4.19 (0.68)
3. The group interaction exercise was appropriate to elicit students' true skills in this kind of group activity.	3.59 (0.67)
4. The writing exercise is an appropriate indicator of students' true writing ability.	3.39 (1.08)
5. I felt I was able to accurately assess students' group interaction skills using the corresponding assessment form.	3.85 (0.59)
6. I felt I was able to accurately assess students' written communication skills using the corresponding assessment form.	3.96 (0.56)
7. I felt I was able to accurately assess students' problem-solving skills using the corresponding assessment form.	3.70 (0.82)
8. I felt I was able to accurately assess my interpersonal communication skills using the corresponding assessment form.	4.00 (0.55)
9. After discussion with the student, I feel I was accurate in my assessment of his/her group interaction skills.	3.85 (0.37) <sup>c</sup>
10. After discussion with the student, I feel I was accurate in my assessment of his/her writing skills.	3.60 (0.60) <sup>c</sup>
11. After discussion with the student, I feel I was accurate in my assessment of his/her problem-solving skills.	3.84 (0.50) <sup>c</sup>
12. After discussion with the student, I feel I was accurate in my assessment of his/her interpersonal communication skills.	3.95 (0.39) <sup>c</sup>
13. I feel that the students reacted to my feedback in a positive manner.	4.30 (0.47)
14. I feel that participating in this workshop activity was a worthwhile experience.	4.39 (0.58)

<sup>a</sup>5 = strongly agree; 4 = agree; 3 = undecided; 2 = disagree; 1 = strongly disagree.

<sup>b</sup>N = 19–23 due to missing values.

<sup>c</sup>For questions #9–13, graduate student assessors could not answer because they did not provide the feedback to students.

### Discussion

Although mean ratings from students' attitude surveys were slightly lower than those from students in the original pilot project, they were still overwhelmingly positive. This decrease may have been due to differences in the students' dispositions; *i.e.*, subjects in the pilot project were comprised of a small sample of volunteers, whereas the larger sample from Phase II encompassed almost the entire class of students.

Attitudinal data from the assessors indicated very favorable opinions toward the seminar in general and their roles as assessors. Typical comments from the open-ended question survey were. . . "I enjoyed participating. . ." "I really enjoyed working with them (the students)," "I think it is a great way to make students aware of skill sets they can brush up on to be better pharmacists." Most of the volun-

teers expressed interest in being involved in future workshops. It was determined, after this successful semester, to continue this Integrated Abilities Seminar format for Phase III.

### PHASE III: FALL 1995

The students who participated in the pilot study (Phase I) in their second professional year were now in their last year of the Bachelor of Science program. To determine their growth in the four outcome abilities, these students were reassessed through participation in an Integrated Abilities Seminar using a format almost identical to the Spring 1995 workshops. The pharmacists, faculty and graduate student assessors who participated in this phase had previously participated in Phase II. Thus, a training session was not deemed necessary.

### Seminar Modifications

Although these students participated in the original "long" version of the Integrated Abilities Seminar, it was determined that using the abbreviated format would be provide a valid reassessment. The original twelve-task in-basket exercise was used, however, for the most accurate comparison to the students' original performances. An extra fifteen minutes was allotted for students to complete the longer version, as had been done in the pilot study (*i.e.*, 60 vs. 45 minutes). The group interaction scenario was modified; students were asked to act as members of a committee whose charge was to make recommendations to revamp a specific first-professional year pharmacy practice course. Students were provided a description of this scenario along with some discussion-provoking questions. Again, they were informed that they could take notes, if desired, to refer to for the written communication assessment immediately following. Three new questions were added to the student attitude assessment survey. The role-play and group interaction exercises were videotaped for data collection. The rest of the session was identical to those sessions from Spring 1995: all self and assessor assessments were finished, feedback was provided, and attitude surveys were completed.

### Data Collection and Analysis

All materials were collected from the students. Instead of comparing these assessors' assessments of these students with the original faculty assessors' evaluations from Phase I, it was decided to have both the original and reassessment performances scored by an "independent" set of pharmacist assessors. All written materials and videotaped performances were organized and distributed to several pharmacists who had participated in the Phase III sessions. These assessors, however, were assigned students whom they had not previously evaluated. For a given student, a pharmacist had both the student's original and second sets of exercises to score. Assessors were given six weeks to complete their assigned students' assessments.

All data were analyzed using the Statistical Package for the Social Sciences (SPSS-X). A probability level of  $P < 0.05$  was used for all statistical tests. Descriptive statistics were calculated for the data, and paired sample t-tests were run to determine if there were any significant differences between students' original and reassessment scores. Further analysis of these data could be undertaken to re-establish instrument and inter-rater reliability. In addition, the "independent" pharmacist assessors' data could be compared with faculty

**Table III. Phase III comparison of students' mean ratings on each exercise between second and fourth professional years<sup>a</sup>**

Exercise	Mean ratings (SD)			
	Second professional year	N	Fourth professional year	N
Group Interaction	3.33 (0.89)	27	3.71 (0.66)*	16
Written Communication	3.64 (0.70)	27	3.77 (0.80)	23
Problem-Solving	3.52 (0.82)	27	3.53 (0.73)	27
Interpersonal Communication	3.50 (0.78)	17	4.05 (0.55)*	17

\*Significant at  $P < 0.05$ .

<sup>a</sup> 5 = Student was consistently effective and demonstrated excellent skills in this area (could serve as a model).

3 = Student was generally effective and demonstrated satisfactory skills in this area (appropriate for this level).

1 = Student was inconsistent or demonstrated deficient skills in this area.

N = No opportunity to observe.

**Table IV. Phase III mean responses on student attitude survey reassessment items<sup>a</sup>**

Survey item	Mean (SD) <sup>b</sup>
Since my third year of pharmacy school, I feel I have grown in each of the following abilities:	
Group Interaction:	4.35 (0.81)
Extemporaneous Writing:	3.60 (0.94)
Problem-Solving:	4.15 (0.67)
Interpersonal Communication:	4.55 (0.51)
The pharmacy curriculum has helped me to develop each of the following abilities:	
Group Interaction:	3.70 (1.03)
Extemporaneous Writing:	2.95 (1.00)
Problem-Solving:	3.95 (0.83)
Interpersonal Communication:	3.80 (1.11)
Modified versions of this workshop should be incorporated into the curriculum for all students to participate in.	4.55 (0.51)

<sup>a</sup> 5 = strongly agree; 4 = agree; 3 = undecided; 2 = disagree;

1 = strongly disagree.

<sup>b</sup> N = 20.

assessors' and other pharmacist assessors' data to determine if any significant differences exist.

### Results and Discussion

Twenty-seven of the original thirty-two student volunteers (84 percent) were reassessed. Unfortunately, due to some technical difficulties, not all students' assessments were captured on videotape. Thus, not all twenty-seven students had all of their performances reassessed. Comparisons of students' mean scores are presented in Table III. All mean scores improved from students' second professional year to their fourth professional year, and mean ratings were significantly improved for the group interaction and interpersonal role-play exercises. This would be expected, as several of the school's pharmacy practice courses emphasize group interaction and patient counseling activities. Very few courses, at that time, utilized extemporaneous writing assessments and none utilized in-basket assessment exercises.

Table IV shows students' mean ratings on the reassessment attitude survey for those questions that were not included on the original attitude assessment survey from Spring 1994. For the most part, students agreed that they have grown in the four assessed abilities (means over four

assessed abilities range from 3.60–4.55 on a five-point Likert scale, with 5 = strongly agree and 1 = strongly disagree) and that the pharmacy curriculum has helped them do so (means over four assessed abilities ranged from 2.95–3.95). Respondents overwhelmingly felt (mean = 4.55) that all students should participate in the workshop in some way or another. Because of continued success and utility of the workshop, it was determined that the seminar should be incorporated into the curriculum.

### PHASE IV: INTEGRATED LABORATORY

A feature of Purdue's School of Pharmacy new curriculum for Doctor of Pharmacy students is an Integrated Laboratory every semester. The Integrated Laboratory is a stand-alone course that encompasses weekly laboratory exercises drawing from all disciplines in the School. Each semester the laboratory is designed to complement courses students are taking concurrently. For example, Integrated Lab II, scheduled for first professional year students during Spring Semester 1997, incorporated laboratory activities from the disciplines of pharmacy practice, biochemistry, nuclear pharmacy, medicinal chemistry, industrial and physical pharmacy, and pathophysiology. A modified version the Integrated Abilities Seminar served as one week's laboratory for the course. Students' participation in the Seminar counted toward their final laboratory grade. Faculty and graduate students were utilized as assessors. Timing of the first offering of these laboratories prohibited use of pharmacists for this phase. It is planned to utilize pharmacists in future semesters, however.

### CONCLUSION AND RECOMMENDATIONS

The Integrated Abilities Seminar is just one method of student performance-based assessment that schools/colleges of pharmacy can utilize to monitor their students' development of particular outcome abilities. In its current format, the Seminar could be easily modified. Other assessment exercises could be utilized, other ability-based outcomes could be assessed, and different types of assessment (*i.e.*, "live" vs. videotaped) could be implemented. Students' content-related knowledge could be assessed concurrently with a particular ability if the corresponding assessment form was modified to reflect this addition. Also, exercises could be modified to integrate principles from different

<sup>6</sup>General educational outcomes for the professional curricula for Purdue University School of Pharmacy and Pharmaceutical Sciences were adopted by the faculty, April 1993.

pharmaceutical disciplines, as opposed to emphasizing primarily pharmacy practice and pharmacy administration principles as they have thus far. For example, the group interaction scenario could be written to portray a team of medicinal chemists discussing approaches to synthesizing a new compound.

Performance-based assessments and feedback are beneficial for all involved. Most students, faculty and pharmacists who have participated in the Integrated Abilities Seminar recognize that development and assessment of ability-based outcomes are important; a student's success in a professional pharmacy curriculum should not be based upon examinations alone. Performance-based assessments provide an opportunity for students to express themselves in a manner that cannot be elicited by typical testing methods. The process of receiving individual feedback, whether written or verbal, shows students where their strengths lie and identifies areas where they may need to improve. In addition, the feedback process allows faculty and pharmacists to interact with students on an individual basis where they may not have extensive opportunities to do otherwise.

Faculty are able to see the development, or lack thereof, of the ability-based outcomes that they adopted for the curriculum<sup>6</sup>. These results may encourage them to modify their efforts to aid students' development of these abilities within their respective courses. Participating pharmacists are able to see how the curriculum has changed, and is continually changing, toward an ability-based PharmD program that emphasizes students' development of general and professional abilities as well as clinical knowledge. Pharmacist involvement early in the curriculum strengthens these emphases. It also provides these pharmacists the opportunity to directly communicate with faculty and students about how components of the curriculum are working. Several participating pharmacists have commented on the increased preparedness and "well-roundedness" of more recent student interns and externs.

Schools should keep in mind when planning ability-based education and placing assessments into their curricula that all efforts should support respective programs' goals and outcomes. The question that should be asked continuously is, "why are we doing this?" For schools considering implementing methods such as those described in this paper, many modifications could be introduced. Students' performances could be videotaped and assessed at a later time rather than be assessed "live;" upperclassmen could be trained and utilized as assessors if pharmacists, faculty, and/or graduate students are not available; feedback could be provided in written form or via audio-or videotape; seminars and other performance-based assessment activities could be a joint venture between the pharmacy program and other programs on campus, (e.g., nursing, business, medicine). Additionally, it would be important to periodically analyze data from the seminars to reaffirm the reliability and validity of the instruments and process used. This is especially important if modifications have been made.

As Purdue's students progress through the curriculum, it is hoped that they will participate in other Integrated Abilities Seminars where their growth and development of outcome abilities can be documented. The School will continue to modify and refine the existing Integrated Abilities Seminar as more experience is gained and more data are collected.

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#### References

1. Penna, R.P. (edit.) *The Papers of the Commission to Implement Change in Pharmaceutical Education*, American Association of Colleges of Pharmacy, Alexandria VA (1994).
2. *Proposed Accreditation Standards and Guidelines for the Professional Program Leading to the Doctor of Pharmacy Degree*, American Council on Pharmaceutical Education, Chicago IL (1995).
3. Purkerson, D.L., Mason, H.L., Chalmers, R.K., Popovich, N.G. and Scott, S.A., "Evaluating pharmacy students' ability-based educational outcomes using an assessment center approach," *Am. J. Pharm. Educ.*, **60**, 239-248(1996).
4. Thornton, G.C., and Byham, W.C., *Assessment Centers and Managerial Performance*, Academic Press, San Diego CA (1982).
5. Alverno College Faculty, *Liberal Learning at Alverno College*, 5th ed., Alverno Publications, Milwaukee WI (1992).
6. Walton, C.A., "Practitioner-educator coalition for reprofessionalizing an occupation," *Am. J. Hosp. Pharm.*, **42**, 1314-1320(1985).
7. Ivey, M.F., "Practice perspective on practitioner-educator relationships," *ibid.*, **42**, 1320-1323(1985).
8. *Education and Practice: Partners for Success*, AACP 95th Annual Meeting Program and Abstract Book, Alexandria VA (1995).
9. Glaxo Career Pathway Program, Glaxo-Burroughs-Wellcome, Research Triangle Park NC.
10. Mason, H.L. and Purkerson, D.L., "An in-basket assessment: Decision-making and time management," AACP/Glaxo Management Resources Project: Cases for Teaching Management Principles, American Association of Colleges of Pharmacy, Alexandria VA (1995).

## APPENDIX A. ASSESSOR TRAINING WORKSHOP SCHEDULE

### ASSESSOR TRAINING WORKSHOP

Morning Agenda  
Jan. 5, 1995  
RPHM Rm. G-18

9:30-9:50 am	Introduction and Background of Assessment session
9:50-10:40 am	Problem-Solving Exercise
10:40-11:10am	Walk-through assessment of Problem-Solving Exercise
11:10-11:25am	Description, observation, and practice assessment of Interpersonal Communication Exercise (role-play/script).
11:25-11:40am	Discussion of Interpersonal Communication assessment
11:40-12:10pm	LUNCH
12:10-12:25pm	Description, observation, and practice assessment of Group Interaction Exercise.
12:25-12:40pm	Discussion of Group Interaction assessment
12:40-12:55pm	Description, example, and practice assessment of Written Communication Exercise.
12:55-1:10pm	Discussion of Written Communication assessment
1:10-1:30pm	Discussion of feedback session and wrap-up

APPENDIX B. INTEGRATED ABILITIES SEMINAR SCHEMATIC

<b>Time</b>	<b>Students</b>	<b>Pharmacist/Faculty Assessors</b>	<b>Graduate Student Assistants</b>
9:30–9:40am	Meet in assigned rooms; pick up packets; put on nametags; introduction of workshop and themselves	Meet in assigned rooms; pick up packets; put on nametags; introduction of workshop and themselves	
9:40–9:45am	Introduction of problem-solving in-basket exercise; distribution of in-basket materials	Go in pairs to separate assigned rooms to set up for interpersonal communication patient counseling role-play exercise	
9:45–10:45am	Work on in-basket exercise and participate in patient counseling role-play	Conduct and assess students in role-play exercise	
10:45–10:55am	In-basket materials collected; self-assess on problem-solving and interpersonal communication exercises	Begin assessment of in-basket exercise	Meet in assigned rooms; begin assessment of assigned students' in-basket exercises
10:55–11:05am	BREAK	Continue in-basket assessment; break if needed	Continue in-basket assessments
11:05–11:10am	Assemble in assigned groups in assigned rooms; introduction of group interaction exercise	Assemble around assigned group so that assigned students can be observed	Continue in-basket assessments
11:10–11:25am	Work on group interaction exercise	Assess students' group interaction behaviors	Continue in-basket assessments
11:25–11:30am	Self-assess on group interaction exercise	Go back to assigned rooms to work on in-basket assessment	Continue in-basket assessments
11:30–11:50am	Introduction of written communication and work on exercise	Complete in-basket assessment	Complete in-basket assessments
11:50–11:55am	Reports collected; self-assess on written communication exercise	Written communication reports assessment	Written Communication report assessments
11:55–12:00pm	Begin Post-Assessment Session portion of Attitude Assessment Survey	Complete written report assessment	Complete written report assessments; distribute all assessments to assigned assessor
12:00–12:30pm	Meet with assessor for 10–15 minute feedback session; complete and hand-in Attitude Assessment Survey	Meet with students in 10–15 minute intervals for feedback; return assessment materials to students	