A Continuous Community Pharmacy Practice Experience: Design and Evaluation of Instructional Materials[1]

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The Community Pharmacy Practice Experience, a two-year longitudinal clinical experience, was guided by six self-directed learning modules designed to: (*i*) stimulate interest in community pharmacy; (*ii*) motivate learning by demonstrating the applicability of didactic course work in contemporary practice; (*iii*) develop communication and psychosocial skills in a holistic approach to pharmacy care; and (*iv*) promote professionalism. The purpose of this report is to describe the development and evaluation of the learning modules and the clinical experience. Six study modules were designed to integrate coursework with practice activities that promoted wellness in the participating family. Participants in the program included randomly selected students from an entering pharmacy class, clinical practice faculty members who served as advisors and program consultants, community pharmacists from both chain and independent practices, and families who met initial screening criteria. Each student was assigned to a participating family. After completing each module, evaluations were completed by students and preceptors. Though both students and preceptors perceived the learning experience as a valuable one, program modifications such as reevaluating program length, retooling modules, strengthening the role of the faculty advisor, and improving patient family selection are suggested to further enhance the learning experience.

INTRODUCTION

Although more than 50 percent of Auburn School of Pharmacy graduates pursue careers in community pharmacy practice, few have had an opportunity to complete a clinically-oriented rotation in a community setting. Lack of scholastic exposure to a clinical community practice may result in the production of community pharmacy practitioners who are skeptical about the viability of such a practice. Pharmacy educators must devise new educational techniques which inculcate into our future practitioners the attitudes, skills, and confidence necessary to establish and maintain a clinical practice in the community setting(1).

The structure of the traditional pharmacy curriculum also has impeded the preparation of graduates for a clinical practice in the community pharmacy setting. In most pharmacy school curricula, students do not complete experiential coursework until the last professional year. This delay in patient contact may contribute to incomplete socialization of students into the profession(2,3). Delayed practice experiences may also diminish students' motivation to learn, because they are unable to recognize the applicability of didactic coursework to community pharmacy practice.

Experiential rotations in most curricula are typically short (weeks) in duration. Such brief and discontinuous experiences cannot capture the unique clinical, social, family, and other attributes that are the essence of continuous community health care. Community care requires professional experience, clinical decision making, and a continuous practitioner-patient relationship that promotes trust and information dissemination. An appreciation of the importance of this continuity of care is difficult to achieve in a traditional, short practice experience.

Medical schools have pilot-tested early experiential coursework to inspire primary care practitioners(4,5); key ingredients of the programs included early but limited clinical involvement through: (*i*) bonding with a patient/family upon entry to medical school; (*ii*) enhanced responsibility as experience and expertise increase; and (*iii*) a focus on care in the home and community. We believe a similar educational model is required in pharmacy. In 1990, the Auburn University School of Pharmacy (AUSOP) established an early practice experience designed to: (*i*) stimulate clinical interest in community pharmacy; (*ii*) promote professionalism; (*iii*) encourage the development and utilization of communication skills, psychosocial skills, and a holistic approach to patient care; and (*iv*) motivate learning. The Continuous Community Pharmacy Practice Experience (CPPE) was a two-year longitudinal clinical experience structured around self-directed learning modules. The goal of this paper is to describe the development of these learning materials, the pedagogical framework upon which they are based, and to report student and preceptor evaluations of the learning process.

METHODS

At Auburn University, the baccalaureate degree program consists of two years of pre-professional course work followed by a three-year professional curriculum. In 1991, students beginning the three-year professional curriculum were asked to volunteer for the pilot CPPE project. These volunteers were randomized to either a control or a study group. Study group students participated in the CPPE by caring for a patient family under the supervision of a community pharmacist preceptor and a faculty advisor. The control group completed an identical didactic and clinical program without this early practice experience.

A student's community pharmacist preceptor was responsible for identifying and recruiting an appropriate family for the student to care for throughout the program. These practitioners were considered vital links between the student

and the patient families as well as important sources of information and patient care experience.

The role of the student's faculty advisor was to serve as an information resource and to act as a program liaison. The faculty advisor helped students achieve a balance between program participation, maintenance of academic standing, and participation in social and professional activities. Faculty advisors helped the students cope with psychosocial issues such as poverty, chronic illness, and death encountered with the patient family. Faculty advisors also were responsible for program data collection and grade distribution.

Suitable families were described as having at least one of the following characteristics: (*i*) at least one member taking more than five medications or more than 12 doses of medication per day, (*ii*) an elderly person, an infant, or a family member who was difficult to educate. Families meeting these criteria were approached by their pharmacist and invited to participate. The participating families granted their informed consent after reviewing information regarding the program.

The study was undertaken in four phases. Phases I and II encompassed program development and design. Phase III marked the implementation of the two-year (six-quarter) longitudinal program. During Phase III the modules and program were evaluated by the participating pharmacists and students. Phase IV consisted of the evaluation of the attitudinal changes which occurred in participating students, preceptors, and families and the dissemination of program results. Described herein are Phases I, II, and III of the project. Phase IV will be described in a future paper.

Phase I

In January 1991, experts in longitudinal clinical programs described in the medical literature were identified and invited to Auburn University School of Pharmacy (AUSOP) to present a one-day workshop for faculty members participating in the CPPE program. A group from the University of Illinois College of Medicine at Rockford discussed their experiences with a three-year early clinical program(4). The seminar included a description of the existing program and a discussion of possible program pitfalls and how to avoid them. A question and answer session allowed an interchange of ideas between the investigators of Auburn's program and the Rockford group concerning program design and implementation. The Rockford group provided suggestions for improvement in project design, development of program instructional materials, criteria for patient selection, and program implementation.

Phase II

All program instructional materials were developed over the next six-month period. Instructional materials included a student manual, a pharmacist preceptor manual, an AUSOP faculty advisor check list, and informational material for the participating families.

Included in the student manual were six instructional modules (one for each academic quarter). The pedagogical framework for these modules emphasized self-directed learning and integration of didactic course work. Collectively, the modules were designed to produce a longitudinal learning experience. Student assignments were based on what was learned in previous modules. Learning activities were designed to correspond as closely as possible with the concurrent

Table I. Typical module activities

1. Complete the specified reading and/or videotape assignment
2. Satisfactorily complete the self-assessment questions
3. Update the patient database
4. Prepare points (interview strategies, drug information, or readings) for discussion with the pharmacist preceptor
5. Upon completion of all module assignments, meet with the faculty advisor
6. Schedule an appointment with the patient family
7. Complete the assignment using the guidelines (schedules or activities) provided
8. Complete questions designed to aid in the preparation of the summary of findings, interview assessments, etc.
9. Discuss the results of patient meetings with the pharmacist preceptor
10. Complete the post-assignment questions and documentation
11. Discuss specifically delineated topics with the faculty advisor
12. Complete the module assessment form
13. Complete the Documentation of Student Activities form
14. Complete the Documentation of Interventions form

didactic coursework in an attempt to reinforce acquired knowledge and motivate students to continue to learn.

The bound student manual[2] contained the following sections:

I. **Introduction.** The introduction outlined the program goals and objectives, defined the roles of the program participants, and discussed the importance of confidentiality.

II. **Before You Start**. The activities to be completed by the student before starting the program were delineated. The section was in tabular format consisting of columns for specified activities, date completed, and comments or notes; the latter two sections were to be completed by the students. Activities included registration with the State Board of Pharmacy, securing of professional liability insurance, completion of pre-study questionnaires, a list of discussion points to be completed with the faculty advisor, and a list of discussion points to be covered with the precepting pharmacist.

III. **Modules I-VI** (Appendix A). Each module was organized into 10 sections: Purpose, Goals, Objectives, Methods of Achieving the Objectives, Self-Assessment Materials for use Prior to Meeting with Pharmacist Preceptor and Patient Family, Post-assignment Self-Assessment Materials and Documentation, References, Student's Evaluation of the Module, Documentation of Interventions, and Documentation of Completion of Study Activities. Attitudinal instruments which were used to evaluate the success of the program were placed at the beginning of the first module, at the end of the third module, and at the end of the sixth module.

The purpose, goals, and objectives were labeled as such and delineated in prose at the beginning of each module. The section entitled Methods of Achieving the Objectives was the most extensive. Each activity necessary for the student to accomplish the goals and objectives of the module

was listed in chronological order (Table I). These very specific guidelines helped communicate the methodology of the program to the students, pharmacists, and faculty involved and served to provide the program with consistency. The methods section also included a check list in tabular format that allowed the student to list the activity, the date completed and any comments or notes. The topics included in the six modules are described below.

Module I – Establishing a Pharmacist-Patient Relationship. Students learned to obtain a medication history through reading and videotaped assignments. With the aid of the preceptor pharmacist, the student developed a list of questions to be used when obtaining a medication history, performed a medication history for one patient, and evaluated the results. In addition, the students used observational skills to assess environmental, economic, and educational barriers to medication compliance for their patient family.

Module II – Expanding Your Patient Family Data Base. In this two part module, medication histories were obtained for family members not interviewed during the first quarter using the students' refined medication history questions and skills. Assessments of compliance, perception of disease, and knowledge were made. In the second section, the student began to learn about drug therapy by examining one drug taken by the patient for a chronic illness. The chronic illness and the drug were selected by the pharmacist preceptor. To integrate the learning experience with didactic instruction in mammalian physiology and biochemistry, the student was asked to identify the biochemical pathways in the body which this drug affected or the drug's mechanism of action, the beneficial effects of the drug, the common side effects of the drug, and methods by which a community pharmacist could determine if the drug was achieving the desired outcome.

Module III – The Pharmacist's Role in Recommending Nonprescription Medications and Managing Patients with Chronic Disease. Module III was designed to demonstrate further how the pharmacist assesses a patient utilizing knowledge of the patient's acute and chronic diseases as well as the patient's usage patterns of over-the-counter and prescription medications. The student updated the medication history data base and selected one chronic disease (under advisement of the pharmacist preceptor). For that disease the student reviewed the pathophysiology, complications, and monitoring parameters. The student reviewed the patient's use of over-the-counter medications and considered the possible interactions that could occur between the patient's disease state and these medications.

Module IV – The Pharmacist's Role in Promoting Appropriate Use of Home Diagnostics and Testing Devices and Appreciation of Automated Medical Record Keeping. The first part of the fourth module emphasized the need for the pharmacist to advocate the use of, understand the need for, and demonstrate techniques necessary for the proper use of home diagnostics and home testing devices. Students learned to use one device that could be employed by the patient family, developed an instructional plan, and actually taught the patient how to use the device. In the second part of the module, automated record keeping in the community pharmacy was introduced. Students evaluated the information available and unavailable from the system employed by the precepting pharmacist. Students were asked to identify the features of a software program that would be useful at their future practice site.

Module V – Evaluating Drug Therapy and Providing Patient Counseling. The pathophysiology of each disease problem and the associated drug therapy was briefly reviewed by the student. Students prepared a summary of medications that their patients were taking for each disease; summaries included the mechanism of action, patient specific dosing information, and side effects of each medication. A counseling session was then prepared for each family member regarding the appropriate use and importance of each medication that was taken utilizing appropriate visual aids for instruction. During the actual counseling session, the student linked the use of home monitoring or testing kits to the medication teaching when appropriate.

Module VI – Identifying and Solving Drug-Related Problems of Patients. Students were directed to review the outcome of individual interventions over the past five quarters and prepare a summary report and evaluation. The student updated the family's comprehensive history database, identified potential problems with each medication regimen, and drafted a therapeutic plan for addressing or overcoming those problems.

Pre-and post-assignment self-assessment questions were included in the manual to allow the student to assess their own understanding of the module, assess their ability to achieve the program objectives, and to foster independent learning. Whenever appropriate, answers to the self-assessment questions were provided.

The manual also included a form entitled "Documentation of Interventions" which was to be updated by the student at the end of each module. It was in tabular format consisting of columns labeled My Intervention, My Goals, and Outcomes. Because the generation of a care plan was a new activity for the pharmacy students, they were encouraged to record any activity which assisted a patient in any way during the quarter. Examples of interventions such as answering questions about medications or health and documentation of noncompliance were provided. Intervention forms were kept by the student, updated at the conclusion of each module, and used as part of the final module assignment.

Each module included a form entitled "Documentation of Student Completion of Study Activities." This was a simple form stating that the student had "successfully met all the objectives" for a specified quarter. To receive academic credit for the course the form was signed by the pharmacist preceptor, the faculty advisor, and the student. One hour of elective credit was awarded for each of the six quarters successfully completed by the student. A grade of satisfactory or unsatisfactory was assigned. The control group received no academic credit for participation.

The Pharmacist's Packet included a copy of the student manual and all written materials that the students were required to read. It also included a simple program evaluation form for each module consisting of seven questions designed to rate the module's educational value, assess time spent interacting with the student, provide suggestions for improving the module, and enumerate observations about

Table II. Student evaluation of the module assignments

| Item | Mean ± SD rating[a] | | | | | | Significant statistical results |
	Module I	Module II	Module III	Module IV	Module V	Module VI	
I learned much this quarter from completing the module.	3.33 (0.65)	2.77 (0.94)	3.36 (0.50)	2.69 (0.85)	2.58 (1.16)	2.67 (0.78)	
The assignments related well to what I learned in other classes.	2.25 (1.06)	2.77 (0.83)	3.21 (0.89)	1.92 (0.95)	2.67 (1.37)	2.58 (1.00)	F=2.58, df=5,45, P=0.039, Modules[b]: 3>4
Readings and audiovisuals were valuable.	3.33 (0.65)	2.46 (1.05)	3.29 (0.82)	2.54 (0.78)	2.33 (0.49)	2.75 (0.45)	df=5,45, P<0.0001 F=5,66, Modules[b]: 1>2,3,4,5,6 3>4
Readings and audiovisuals available.	3.92 (0.29)	2.61 (0.77)	3.50 (0.65)	2.31 (1.49)	2.58 (0.67)	2.83 (0.72)	F=5,18, df=5,45, P=0.001, Modules[b]: 1>2,4,5,6 3>4
Recommended references were valuable.	2.83 (0.72)	2.85 (0.69)	3.50 (0.52)	2.54 (1.13)	2.67 (0.65)	2.75 (0.75)	F=2,4, df=5,45, P=0.03, Modules[b]: 3>4
Documentation assignments were a valuable part of this module.	3.08 (0.79)	2.77 (0.72)	2.86 (0.77)	2.23 (1.23)	2.42 (1.08)	2.67 (0.78)	F=2,6, df=5,45, P=0.029, Modules[b] : 3>4

[a]Strongly Agree = 4; Neutral = 2; Strongly Disagree = 0.
[b]Tukey HSD Procedure, P<0.05.

changes in the student's abilities or attitudes during the quarter.

Three types of materials were developed for the participating families. A pamphlet describing the program and the potential roles of the student, the pharmacist, and the family members was used by participating pharmacists to help them recruit suitable patient families. The patient's primary physician(s) received a letter informing them about their patient's participation in the program and providing them with the name of a faculty member to contact if questions arose. A family packet was developed that included a copy of the pamphlet, a copy of the letter that was being mailed to the physician(s), an informed consent document, and a ten-question three-point Likert-style questionnaire designed to measure the patients' attitudes toward pharmacists and pharmacy students.

Phase III

After completing the development of program instructional materials, program implementation began. In Phase III participating pharmacists and patient families were selected and students were assigned.

Pharmacists in the community were selected based on their reputations as role models and previously demonstrated willingness to participate in educational programs. Each was sent a letter describing the program and invited to a morning breakfast seminar during which the program was described in detail. At the seminar, the pharmacists received a copy of one program module and discussed their role in completing the module. Because the responsibility for patient recruitment would rest solely on their shoulders, the criteria for a suitable patient family and the recruitment pamphlet were reviewed.

Once the precepting pharmacists and patient families were identified, each pharmacist was assigned a faculty liaison who also would serve as the faculty advisor for the student assigned to the family. The faculty advisor met with each family, described the program verbally, read and obtained a signed informed consent, administered the first questionnaire, and provided the family with a copy of the family packet.

During Phase III, the program was described to all students entering Auburn University School of Pharmacy in September 1991. Of 100 students, 36 volunteered to participate in the program. Of the 36, 16 were randomly assigned to the study group; 20 served as the control group. The study group participated in the two-year (six-quarter) program. Both the control group and the study group answered attitudinal surveys designed to assess attainment of the program's goals at the beginning of the first academic year, at the end of the first academic year, and at the end of the second academic year; these data will be reviewed in a future paper.

Module Evaluations. During Phase III both students and preceptors completed an evaluation of each module. At the end of each quarter, the students responded to 19 statements designed to measure their sentiments about the quality of learning through module assignments and the value of interactions with their preceptor, faculty advisor, and patient family. Using a five-point Likert-format scale, the students indicated their degree of agreement with these statements. In addition the students completed five questions to assess the length of time spent participating in each aspect of the program. Three other questions allowed the students to comment in prose about the possibilities for future program improvement. The pharmacist preceptors' evaluation provided an overall subjective rating of each module, an approximation of time spent interacting with the student, and five questions that allowed them to comment in prose about the possibilities for future program improvement.

Statistical Analysis. To assess differences in the quality of the six modules, the mean ratings of each Likert-format statement were compared using repeated measures analysis

Table III. Student perceptions of learning

| Item | Mean ± SD rating[a] | | | | | | Significant statistical results |
	Module I	Module II	Module III	Module IV	Module V	Module VI	
I feel more confident talking with patients.	3.17 (0.58)	2.85 (0.80)	2.86 (0.77)	2.46 (0.97)	3.00 (1.04)	2.75 (0.87)	
What I have taught myself has been an accomplishment.	3.08 (0.51)	2.85 (0.55)	2.93 (0.62)	2.85 (0.69)	2.58 (1.16)	2.67 (0.78)	
I wish all courses were in the form of self-paced learning modules.	1.67 (1.15)	2.46 (1.05)	1.07 (1.00)	0.85 (0.99)	0.92 (0.90)	0.83 (0.58)	
I felt comfortable discussing my self-assessment with my faculty advisor.	3.27 (0.47)	2.85 (0.55)	3.00 (0.78)	2.50 (0.52)	3.25 (0.75)	3.08 (0.51)	
The program should be required in the curriculum.	2.33 (0.65)	1.69 (1.38)	2.07 (1.00)	1.08 (0.95)	1.00 (0.74)	1.25 (0.75)	F = 5.93, df = 45,5, $P< 0.0001$ Modules[b]: 1>4,5

[a]Strongly Agree = 4; Neutral = 2; Strongly Disagree = 0.
[b]Tukey HSD Procedure, $P<0.05$.

of variance(6). When the variance-covariance matrix assumptions were not met, multivariate analysis was performed. If the repeated measures analysis indicated a statistically significant difference among the six scores, the Tukey HSD procedure was performed to determine pairs of scores that were statistically different. The *a priori P*-value was <0.05. All statistical analyses were performed using SPSS for Windows Release 6.0(7). The five questions that assessed the length of time spent in completing each aspect of the program were summarized descriptively.

Written preceptors' comments were reviewed and summarized. Overall module evaluations and time spent interacting with the students were expressed as a percentage of those responding to the item.

RESULTS

Student Evaluation of the Module Assignments. Across the six quarters, 66.6-100 percent of the students either agreed or strongly agreed that they learned much from completing the assigned module. This item was the only one for which there was no statistical difference among the six modules (Table II). For each of the other items, there was at least one difference that was statistically significant. The congruence of module assignments to coursework differed for Modules III and IV with III receiving the highest rating and IV the lowest. Modules I and III had the highest ratings for audiovisual materials and access to these materials. Module III had significantly higher ratings than IV with respect to references and documentation. While Module III did not differ from I, II, V, and VI, it was consistently higher than Module IV suggesting that these two modules reflect the extremes in this process.

The majority of students were neutral or disagreed that the assignments completed in Module IV were valuable. In contrast, the majority of students either agreed or strongly agreed with this statement upon completion of the other five modules.

Student Perceptions of Learning. Upon completion of the six modules, 64.3-91.7 percent of students agreed or strongly agreed that they felt more confident in talking with patients.

Although the percentage agreement with this statement was highest upon completion of Module I, it was not statistically different from that measured upon completion of each of the other five modules (Table III). The majority of students also agreed or strongly agreed that they felt a sense of accomplishment in completing the self-directed learning modules. However, most were either neutral, disagreed, or strongly disagreed that all courses should be self-paced. Throughout the program, the majority of students either agreed or strongly agreed that they felt comfortable discussing their self-assessment.

Across all six quarters, the majority of students were either neutral, disagreed, or strongly disagreed that the program should be required in the curriculum (Table III). The rating of the item stating, "the program should be required in the curriculum," was highest at the end of the first quarter and lowest at the end of the fourth and fifth quarters.

Time Spent. As part of each module evaluation, students reported the amount of time they spent completing the learning activities and interacting with their patient family. In completing Module I, the majority of students spent two to three hours completing learning activities such as reading and watching videotapes. After completing module I learning assignments, students spent 30 minutes to one hour with their patient family. In contrast, students spent less time (one to two hours) completing learning activities but greater time with their patient family (one to two hours) during Modules II, III, and IV. Of all the modules, students spent the least time completing the learning activities (< one hour) and interacting with their patient family (< one hour) during module VI.

Student Evaluation of the Teaching Process. Across all six quarters 66.7 to 100 percent of students agreed with the statement, "the time I spent with my patient family was valuable." The mean rating of this item was highest at the end of the first quarter and lowest at the end of the sixth quarter. However, this trend was not statistically significant (Table IV).

Each quarter, the students interacted with their preceptor

Table IV. Student evaluation of the teaching process

| Item | Mean + SD rating[a] | | | | | | Significant statistical results |
	Module I	Module II	Module III	Module IV	Module V	Module VI	
The time with the patient family was valuable.	3.42 (0.51)	2.92 (0.64)	3.21 (0.70)	3.00 (1.08)	2.75 (1.14)	2.67 (0.78)	
The time with the faculty advisor was valuable.	3.00 (0.60)	2.54 (1.05)	3.15 (0.69)	2.25 (0.75)	2.92 (1.08)	3.00 (0.43)	
The time with the preceptor pharmacist was valuable.	3.17 (0.58)	2.77 (0.83)	3.14 (0.77)	2.67 (1.07)	2.67 (0.98)	2.50 (0.67)	[b]$F=76.3$, df=5, $P=0.001$
The pharmacist helped me identify how to improve my performance.	2.75 (0.75)	2.54 (0.66)	2.50 (0.65)	1.92 (1.11)	2.33 (1.15)	2.08 (0.90)	
The faculty advisor helped me identify how to improve my performance.	3.00 (0.60)	2.38 (1.04)	3.14 (0.66)	2.42 (0.79)	2.58 (0.99)	2.92 (0.79)	
I liked working at my own pace.	3.58 (0.51)	2.85 (1.07)	2.79 (1.05)	2.38 (1.26)	2.92 (1.16)	3.00 (0.74)	
I would have preferred more direction from an instructor.	1.92 (0.90)	2.23 (0.83)	2.50 (1.02)	2.69 (1.38)	2.50 (1.09)	2.00 (1.21)	

[a]Strongly Agree = 4; Neutral = 2; Strongly Disagree = 0.
[b]Hotellings T^2, $P<0.05$.

about the module assignments and their interactions with their patient family. Student attitudes about the value of their interactions with their preceptor were highest at the end of the first quarter and lowest at the end of the sixth quarter. For example, at the end of the first quarter 91.7 percent of students agreed or strongly agreed that the time spent with their pharmacist preceptor was valuable. By the end of the sixth quarter only 58 percent of students agreed with this statement.

Across all six quarters, the majority of students were either neutral or agreed with the statement," the preceptor pharmacist helped me identify how I could improve my performance." Attitudinal ratings of this item were highest at the end of the first quarter; however, there was not a statistical difference in the ratings of this item across the six quarters. At the end of the first quarter, only 33.3 percent of the students agreed or strongly agreed with the statement that, "I would have preferred more direction from my preceptor." The mean rating of this item was not statistically different across the six quarter periods.

There was no statistical difference across the six quarters in student attitudes about the value of their interactions with their faculty advisor. Except for the fourth quarter, 61.6 –89.6 percent of the students indicated the interactions with their faculty advisor were valuable. At the end of the fourth quarter, approximately 42 percent of students agreed the interactions with their faculty advisor were valuable. Across all six quarters, 58.3 –83.4 percent of students agreed or strongly agreed that their faculty advisor helped them identify how to improve their knowledge and skills. During the program, the students had slightly greater agreement that their faculty advisor helped them identify how to improve compared to their pharmacist preceptor.

The majority of students agreed or strongly agreed with the statement that they liked working at their own pace. The mean rating of the questionnaire item that assessed this attitude was not significantly different across the six quarters.

Pharmacist Preceptor Evaluation of Module Assignments. The first three modules were rated Very Good or Good by more than 90 percent of the preceptor pharmacists (Table V). The last three modules were rated Very Good or Good by only 78 to 87 percent. Most pharmacists spent 30 minutes to one hour interacting with their students each quarter; the time spent ranged from less than 30 minutes to four hours.

Prose recommendations for module improvements were extremely varied and did not seem to fit any specific pattern. Suggestions for improvements made by two or more preceptors included more emphasis on environmental factors and economic constraints. They also recommended that students should be required to evaluate more than one drug and disease state, and more information about third party payers should be provided. Several preceptors felt that Modules V and VI were redundant. None of the preceptors felt that additional materials were necessary in the preceptor packet or student manual for any of the modules. Recommendations for overall program improvements made by two or more preceptors included: (*i*) lengthening the mandatory contact time with pharmacist preceptor in the pharmacy; (*ii*) better patient selection; (*iii*) requiring the course for all students in pharmacy school; and (*iv*) shortening the program to three quarters.

The pharmacist preceptors were asked to identify changes observed in the student's knowledge, attitudes or psychomotor skills. Throughout the series of modules, written comments by the pharmacist preceptors indicated that the students were observed to become more confident, more knowledgeable, more empathic toward economic constraints, and more professional in demeanor. Students were often noted to have improved communication skills and increased ability to assess compliance.

Table V. Pharmacist preceptor evaluation of module assignments[a]

Item	Module I	Module II	Module III	Module IV	Module V	Module VI
Rated module good or very good	92[a]	90	100	81.8	77.8	87
Time spent interacting with students						
< 30 minutes	7.7	0	0	9.1	11.1	22
30 min-1 hour	38.5	60	55.6	45.5	55.6	7.6
1–2 hours	38.5	40	22.2	27.3	22.2	1.1
2–3 hours	7.7	0	11.1	18.2	0	0
3–4 hours	7.7	0	11.1	0	11.1	0

[a]Expressed in percent of total respondents.

DISCUSSION

Students felt that the learning experiences gained from Year 1 (the first, second and third modules) were most valuable. The readings of Module I were felt to be most valuable. Both the readings and audiovisuals assigned in Module III received high ratings as well. Module III also related best to material presented in the traditional didactic curriculum, which may have contributed to student satisfaction. When questioned verbally, many students felt that the last two assignments were repetitive in nature and felt that the program should be shortened to one year in length.

Though not statistically significant there appears to be a trend to suggest that students felt that the time spent with their pharmacist preceptor was more valuable during the first three quarters of the program. The same trend is evident in the students' assessment of how well the pharmacist preceptor helped identify ways to improve pharmaceutical skills. There may be several reasons for this trend. First, an improvement in confidence and communication skills throughout the course may have decreased the dependence on the pharmacist preceptors. The design of the modules may have fostered independent learning and necessitated less reliance on the preceptors during the second year as well. Second, the cited redundancy of the last modules may have also decreased the value of the pharmacist preceptor interactions. In addition, though the program was intended to be longitudinal in nature, the pharmacist preceptors changed for six of sixteen students. Reasons necessitating change included transfers, relocations, and death.

During each of the six quarters 61.6-89.6 percent of the students indicated the interactions with their faculty advisor were valuable. Due to faculty resignations and retirements, faculty advisors also changed frequently. Over the two-year period twelve of sixteen students changed faculty advisors at least once. These changes were felt to have a detrimental effect on the continuity of the program and could have contributed to the students' dissatisfaction in the second year.

Students felt that the program, as experienced, should not become a part of the required curriculum. Sentiments of students became stronger at the end of modules IV and V. It is possible that program length or minimal number of academic credit hours allotted to the program played a part in these attitudes. Students received only one credit hour per quarter for the CPPE which may have placed minimal importance on this course. In contrast, students receive from three to five academic credits per quarter for other pharmacy school courses. The changes in pharmacist preceptors, faculty advisors and patient population over a two-year period may have also decreased the intended continuity of the experience. These changes, in combination with the redundancy of material cited by students and preceptors, have led to the following recommendations.

To improve the teaching process, the program length should be carefully evaluated. Medical educators have found shorter longitudinal programs to be as effective as longer ones(8). Experience with a family attachment program for medical students that spanned more than a decade has been described(8). Based upon student feedback, this program was first shortened from 18 months in length to one year and then again shortened to six months. The educational value perceived by the students was not detrimentally affected by shortening the program from twelve to six months. In addition, the authors stated that the shortened program was much easier to administer. Educators must seek a balance between teaching/precepting time and the educational value of such a program. Both ease in administration and unaffected educational value in the medical school model has led us to believe that a one-year program should be considered.

Retooling the modules and the program to prevent redundancy and expose the students to a more challenging learning experience should be attempted. Each module should present new challenges in addition to repetitive skill building activities. The program should make provisions for adding a second, more challenging family if necessary to complete assignments and maintain student interest.

Future CPPEs should strengthen the faculty advisor's role in the program. Advisors could facilitate student learning by incorporating group discussions during which students can reflect upon and examine their learning experiences. In both nursing and physician clinical training programs, reflective group discussions have been advocated(9-11). Following a three-month family attachment program designed to foster teamwork between nursing students, items on a Likert-style questionnaire revealed that though the overall degree for which the students shared most responsibilities was only moderate, the theme of most of the items measuring attitudes toward teamwork was positive(12). The authors suggested reflective assignments and faculty facilitated discussion to increase the likelihood that students achieve programmatic goals. In a longitudinal program designed for medical students, faculty mentors or docents have been successfully used to facilitate achievement of the program's goals(13).

In the CPPE, the faculty advisors should be required to facilitate group discussions quarterly. These discussions could enrich the learning experience for all students, especially those having difficulty completing a particular assignment with a particular patient. During these discussions, students might acquire ideas for completing program assignments,

meeting program objectives, and dealing with difficult situations from other students as well as the faculty facilitator.

Based upon the experience in this pilot program, better family selection is also essential. In several instances the pharmacist preceptors made poor choices of patient families. One patient family included a retired pharmacist who was initially thought to be a very receptive potential patient by the precepting pharmacist, but in reality it provided very little opportunity for student intervention. Several preceptors remarked that patients chosen to participate should be "less than ideal" - have economic, educational, or medical barriers to successful drug treatment or compliance. During a medical school family attachment program students who cared for "sick" children felt that they played an important role in provision of emotional support for the families; whereas, students who cared for "normal" children felt that they played a more significant role in providing advice on minor medical matters. This medical school model demonstrated that patient selection will play an important role in determining which of the program goals are achieved(14). To achieve our program goals, we feel that the delineated guidelines for family selection should be strictly followed and enforced.

If and when our program is expanded to the entire student body, pairing students may be a necessity due to both faculty and site constraints. Pairing of students has been found to confer added benefits to the learning process such as fostering communication, facilitating the concept of teamwork, and facilitating the acquisition of clinical skills(15).

CONCLUSION
The two-year CPPE was perceived by both students and pharmacist preceptors as a valuable overall experience. Modifications are recommended which are hoped to further enhance the quality of learning as perceived by the students. These modifications include shortening the CPPE to one year in length or retooling the modules, increasing faculty involvement as quarterly discussion facilitators, insuring adherence to family selection criteria, and if necessary due to site constraints, consider pairing students. Assets of program design that will be retained will include the student manual and its self-assessment format, the preceptor packet, family educational materials, and the "Dear Doctor" letter.

Phase IV of this study will be presented in a future paper. The ability of the program to stimulate interest in clinical practice in the community setting, promote professionalism, and motivate learning will be evaluated utilizing the Likert-style questionnaires administered at the beginning and at the end of the program. The ability of the program to improve student communication skills will be evaluated by comparing the grades of the students in the control and study groups in a required communications course. The attitudes of pharmacist preceptors and patient families before and after the educational experience were also measured using Likert-style questionnaires. The outcomes of these comparisons will be presented in the future as well.

References
(1) Commission to Implement Change in Pharmaceutical Education, "Background paper II: Entry-level, curricular outcomes, curricular content and educational process," *Am. J. Pharm. Educ..,* **57**, 377-385(1993).
(2) Hatoum, H.T. and Smith, M.C., "Identifying patterns of professional socialization for pharmacists during pharmacy schooling and after one year in practice," *ibid.*, **51,** 7-17(1987).
(3) Smith, M. and Messer, S., "A longitudinal study of attitude change in pharmacy students during school and post graduation," *ibid.,* **55**, 30-35(1991).
(4) Gravdal, J. and Glasser, M., "The integration of the student into ambulatory primary care: A decade of experience," *Fam. Med.*, **19**, 457-462(1987).
(5) Rose, B.K. and Osterud, H.T., "Humanistic geriatric health care: An innovation in medical education," *J. Med. Educ.*, **55**, 928-932(1980).
(6) Stevens, J., *Applied Multivariate Statistics for the Social Sciences*, 2nd ed., Lawrence Erlbaum Associates, Hillsdale NJ (1992).
(7) Norusis, M.J., SPSS Inc., *SPSS for Windows Release 6.0*, SPSS Inc., Chicago IL (1993).
(8) Schreier, A.R., Wagstaff, L.A., Ahmed, N. and Pols, A., "Medical students and families: An attachment program," Teach. Learn. Med., **4**, 49-55(1992).
(9) Gordon, M.J., "Self-assessment programs and their implications for health professions training," Acad. Med., **67,** 672-679(1992).
(10) Saylor, C.R., "Reflection and professional education: Art, science, and competency," Nurse Educator, **15**, 8-11(1990).
(11) Atkins, S. and Murphy, K., "Reflection: A review of the literature," J. Adv. Nurs., **18**, 1188-1192(1993).
(12) Warner, M., Ford-Gilboe, M., Laforet-Fliesser, Y., Olson, J. and Ward-Griffin, C., "The teamwork project: A collaborative approach to learning to nurse families," J. Nurs. Educ. , **33**, 5-13(1994).
(13) Calkins, E.V., Arnold, L.M., Willoughby, T.L. and Hamburger, S.C., "Docents' and students' perceptions of the ideal and actual role of the docent," J. Med. Educ. , **61**, 743-748(1986).
(14) Schreier, A. and Bub, B., "Attitudes of medical students to a family attachment scheme," *S. Afr. Med. J.*, **51**, 501-503(1977).
(15) Duckwall, J.M., Arnold, L., Willoughby, T.L., Calkins, E.V. and Hamburger, S.C., "An assessment of the student partnership program at the University of Missouri—Kansas City School of Medicine." *Acad. Med.,* **65**, 697-701(1990).

APPENDIX A.
FIRST QUARTER MODULE
MODULE I

ESTABLISHING A PHARMACIST-PATIENT RELATIONSHIP

Purpose:
This first module will stress the development of social skills between you, the pharmacy student and the program family. A pharmacist must be able to quickly greet the patient, make him feel comfortable, perform an initial needs assessment and medication history. This is accomplished through highly developed observational and communication skills.

Goals this Quarter
- Arrange a meeting with the preceptor pharmacist and the participating home family.
- Obtain a comprehensive medication history for 1 or 2 members of the family.

Objectives:
Upon completion of this module, the pharmacy student shall be able to:
1. Identify questions that are appropriate for a medication history.
2. Identify appropriate and inappropriate verbal responses to patient comments or questions.
3. List techniques for motivating a patient to communicate.

4. Perform a medication history.
5. Recognize the significant findings of the medication history.
6. Observe the patient's home surroundings and note signs of habits, reading ability, etc. which may determine if the patient can or will be compliant with their medication regime.

Methods of Achieving the Objectives
The following checklist of activities will assist you in accomplishing the objectives of this module. Place a check in the second column when you have completed the stated activity. You may use column 3 to note any points you would like to discuss with either your preceptor or faculty advisor.

Activity	Date Done	Comments/ Notes
1. Read McKenzie, M.W., How to Conduct a Medication History. Pages 81-127. Copies of this chapter are on reserve in the Learning Resources Center.		
2. Watch the tape entitled Medication History Interview (VT76C06) which is located in the Learning Resources Center.		
3. After completing the assigned reading, take the self-assessment test on pages 11-12. If you answer more than one question incorrectly, you should go back and review the assigned reading. If an answer is unclear or confusing to you, discuss it with your preceptor pharmacist.		
4. Review the information about your patient's medications that is currently on file in the pharmacy.		
5. Discuss your interview strategy with your pharmacist preceptor. It may be possible to set up a mock interview with your pharmacist preceptor before your first meeting with your assigned patient family.		
6. Meet with your faculty advisor to review your self-assessment materials.		
7. Make an appointment for a home visit with one or two members of your patient's family.		
8. Interview at least one family member.		
9. Prepare a list of significant findings obtained during the interview with the patient. Significant findings might include observations about the patient's living environment, personal habits, knowledge of medications, list of medications, compliance with medication regimen, or any potential side effects the patient may be experiencing. Example 1:		

Activity	Date Done	Comments/ Notes
Observation: The patient has no indoor plumbing. Possible significance: The patient may not be compliant with an expensive medication regimen, because he can't afford the medications. Example 2: Information gained: The patient smokes 3 packs of cigarettes per day, and he has done so for 25 years. Possible significance: The patient may take drugs that interact significantly with cigarette smoking (theophylline), or the patient may have a disease that will recur if cigarette smoking is not discontinued (duodenal ulcer).		
10. Discuss the results of your interview(s) with your pharmacist preceptor and refine your interview technique.		
11. Complete the post-assignment self-assessment and documentation on pages 13–17.		
12. Meet with your faculty advisor and review the activities you have completed this quarter. Discuss: • Answers to Post-Assignment Self-Assessment/Documentation (pages 13-17). • Discuss the strengths of your patient interview(s) this quarter. • Discuss strategies to improve your interview skills.		
13. Complete Assessment of Module I and return to Department of Clinical Pharmacy Practice secretary.		
14. Complete Documentation of Student Completion of Study Activities and return to Department of Clinical Pharmacy Practice secretary by the first day of final examinations. You WILL NOT receive credit for this course until this is done.		
15. If you did anything to help a patient this quarter, record this information on the form entitled Documentation of Interventions. Interventions can include answering questions about medications health, etc., documentation of noncompliance and many others. Save and turn this form in at the end of the program.		