A Problem Solving Active-Learning Course in Pharmacotherapy[1]

Jeffrey C. Delafuente, Thomas O. Munyer, David M. Angaran and Paul L. Doering
College of Pharmacy, University of Florida, Health Science Center, Box 100486, Gainesville FL 32610-0486

PROLOGUE

To meet many of the competencies and teaching innovations which the profession has endorsed, we conceived a new course which integrates concepts, skills, and knowledge learned in previous coursework. Expected course outcomes are improved problem solving skills, oral and written communication skills, group interaction skills, self learning abilities, and utilization of pharmaceutical care principles. One major goal was to develop a prototype course demonstrating that patient centered active learning among a large number of students can be achieved. This three semester credit course meets three times weekly for 50 minutes each period. Twelve groups of six or seven students are randomly assigned. The course is case based with three days allotted for each case. Students are required to interact with each other to identify and solve patient related problems, and use appropriate communication skills in role playing exercises to interact with patients and other health care professionals.

INTRODUCTION

There has been a call for the development of courses which inculcate problem solving competencies in students and utilize active-learning methodologies (1,2). Our experiences have suggested that many students enter into clinical clerkship courses without appropriate skills necessary to attain maximum learning from these courses. We believe that part of the problem is caused by the marked transition of students moving from a passive learning environment in the classroom to an active learning environment in experiential courses. Students generally have limited experiences in active-learning situations requiring application of knowledge. We therefore decided to develop a course that would begin to develop the necessary competencies required for successful learning in the experiential component of the curriculum and engage the students in an active-learning process simulating a practice experience. To meet many of the competencies and teaching innovations called for in "Background Paper II"(1) adopted by AACP, we conceived a new course which we describe here that integrates concepts, skills, and knowledge to identify and solve patient related problems. Another goal was to develop a prototype course demonstrating that patient centered active learning among a large number of students can be achieved.

COURSE DESCRIPTION

This is a three semester credit course required for PharmD students in their last semester of their third professional year. Expected course outcomes are improved problem-solving skills, oral and written communication skills, group interaction skills, self learning abilities, and utilization of pharmaceutical care principles. Literature evaluation as a means to identify and solve clinically relevant problems is part of the student centered learning approach used in this course. The course serves as a capstone for the curriculum prior to externships and clinical clerkships.

GOALS AND LEARNING OBJECTIVES

The goals of this course are to have students learning and using the competencies necessary to provide pharmaceutical care. Students will learn pharmacotherapy knowledge and demonstrate that they can:

1. develop a patient focus and responsibility
2. perform systematic medication profile reviews
3. identify issues (potential and actual drug-related problems) associated with the patient's drug therapy
4. use a variety of resources, such as patient information, reference materials, health care professionals (nurses, physicians, others), and medical chart information
5. develop self-learning skills
6. determine desired therapeutic outcomes
7. identify therapeutic alternatives
8. produce and communicate therapeutic care plans
9. determine monitoring parameters for the therapeutic care plan
10. acquire good group dynamic skills, and cooperative learning skills
11. orally present and defend their therapeutic care plans
12. develop self- and peer-evaluation skills

COURSE PROCESS

This course meets three times weekly (Monday, Wednesday, Friday) for 50 minutes per session. The first two weeks of the course consist of faculty presentations orienting students to this new course format, reviewing systematic profile review processes, reviewing literature evaluation methods, and reviewing a sample case scenario. After the first two weeks and throughout the rest of the course students work in groups of six or seven. The groups are randomly assigned and students change groups every two weeks.

On the second Friday of the semester and every following Friday, students are given the case scenario for the next week. Students are required to review and begin work on the case scenario over the weekend or at least on Monday morning prior to the class meeting.

Each case scenario is role played with the students acting as the pharmacist and the faculty serving as patients and other health care providers. In some instances, actual patients are used. Information given to the students prior to role playing include the pharmacy setting (*e.g.*, community, satellite, clinic, hospital), the patient's chief complaint, medi-

[1] Manuscript based on a submission to the Council of Faculties Innovations in Teaching Competition.

cation history or medication profile, physical observations (*e.g.,* thin, frail, rash), and other information that would normally be available to the pharmacist in the role playing setting.

Students are given a set of pharmaceutical care questions (Appendix A) that remain the same for each scenario. They are designed to help students in several ways. Answering these questions shows students a systematic patient work up process. They help identify what the students know and what they don't know and guide them in deciding what they must learn for the case. Students are expected to learn necessary knowledge independently and from sharing information within their groups outside of class time. These questions also help students to think in terms of pharmaceutical care and to self evaluate their knowledge. Ideally, students divide the various tasks identified and each works on a particular aspect of the case problem. Students work on these questions independently and then discuss their answers with the members of their group.

CLASSROOM ACTIVITIES

An abbreviated summary of the daily classroom activities is shown in Appendix B. Below is a more detailed description of these activities.

Mondays

On Mondays students meet in the classroom to review the case scenario with their assigned group. One person from each group is randomly selected to turn in their answers to the first four pharmaceutical care questions. This person is also the spokesperson for their group to interview either the patient or physician for more information pertaining to the case. For the first 20 minutes, student group members can compare answers to the pharmaceutical care questions and determine what interview questions the group should ask. Students are allowed to bring any reference materials to class, including books, class notes, journal articles, company promotional materials or any other source of information.

During the last 30 minutes of class, the group's spokesperson asks questions of the patient or physician, role played by the faculty or in some instances, actual patients. Only one individual from each group can ask questions. Group spokespersons must word the question as though they are asking that person (patient or doctor) for information in a realistic setting. Each group's spokesperson has only two minutes to ask questions. These questions are limited to information assessment only. Faculty will not answer knowledge content questions that students can answer from reference materials. The group's spokesperson receives an evaluation based upon their interviewing skills. This interviewing is extremely important. Students, as a class, are responsible for discovering all relevant information about the case from the patient and physician. Often, crucial information is intentionally withheld until appropriate questioning takes place. After all groups have had an opportunity to ask questions, students briefly meet in their group and each group is then allowed to ask one follow up question. If students don't ask, faculty won't give out pertinent information. Students need this patient-related information to develop a proper care plan and perform well on weekly quizzes related to knowledge content of the case. Mondays also provide time to discuss the case from last week to clarify any specific points.

Wednesday

On Wednesdays students again meet in their groups for about 20 minutes. Students can review what they learned and decide what further information they need. Another person is randomly selected to be the group's spokesperson for patient or physician interviewing for the next 30 minutes. The same format is used as on Monday. Again, each student is evaluated based upon their interviewing skills.

After groups have worked together for their two week period, students receive a group dynamics evaluation form. These evaluations identify the extent and quality of each student's participation within the group and how the student's interactions were perceived by themselves and their peers. These peer- and self-evaluations are turned in at Friday's class. Completion of these evaluations is required and results count toward students' final grades.

Friday

At the beginning of class on Friday, each group turns in their written therapeutic care plan for the week's patient. Then a third set of individuals, one from each of the groups, is randomly selected for oral defense of the group's therapeutic plan. During the first 35 minutes of class, faculty ask each student at least one question and a follow-up question while assembled as a panel seated before the whole class. These questions are drawn from the pharmaceutical care questions. Each student has between three to four minutes to respond. Students are asked what they have identified as the drug related problem(s) and to defend their (or their groups) therapeutic care plan. The student's ability to accurately answer questions and oral communication skills are evaluated.

During the last 15 minutes of the class, each student takes a case-specific quiz. This quiz consists of 10 multiple choice questions based on knowledge specific to the case scenario. As before, references and other materials may be used in answering quiz questions. At the end of class, after students turn in their answers to the quiz they receive the answers to the quiz, the faculty's assessment of the case scenario and written therapeutic care plan, the next week's case scenario, and the new group assignments, if appropriate.

CASES AND FACULTY INVOLVEMENT

Initial case selection was based on a wide spectrum of common, medication responsive disease states and drug-related problems. Available faculty expertise to participate in the course was also a factor in case development and selection. Many of the cases selected were modified from *Workbook for Clinical Pharmacy and Therapeutics,* 5th edition(3).

Cases were modified to occur in a variety of practice settings (*e.g.,* community practice, nursing home, home care, or family practice clinic). Early in the course we minimized the number of drug-related problems, and increased the number and complexity of the problems as the course progressed. We added patient-related information that required the students to consider such non-pathophysiological characteristics in their therapeutic plan development as economic status, patient preference, and care support system. We also gave students information which described the student's role (*e.g.,* community pharmacy owner), relationship and prior knowledge of the patient (*e.g.,* long-term patient or friend), and the prescribing physician spe-

cialty, prior experience, and attitude toward pharmacy.

Faculty were assigned to each case and were asked to prepare a standard SOAP-based (Subjective, Objective, Assessment, Plan) therapeutic plan for each drug-related problem, a 10 question quiz, and prepare for the simulation exercises by discussing what specific pharmaceutical care characteristics that were to be highlighted by this case. The SOAP format was modified to SOAPE, with the E standing for patient Education to meet OBRA-90 regulations.

To standardize classroom format and participation of many faculty we had some educational and training issues to deal with for the faculty in preparation for this course. One of these issues was having faculty learn how to define the therapeutic goals for each drug-related problem in objective terms with an associated defined time frame. Other issues were defining therapeutic failure in objective terms with an associated time frame and structuring the SOAPE therapeutic plan to fit the practice setting. Defining therapeutic goals in terms of quality of life and functional status that met the patient's expectations, whenever possible, was also something that several faculty had not done before. Considerable time was required in explaining the unconventional nature of the teaching method since most participating faculty were accustomed to teaching in a strictly lecture format.

GRADING

Students are evaluated by their individual performance, their group's performance, and their performance within their group. Individual student effort is evaluated in: interviewing, oral defense, weekly quizzes, and written responses to the pharmaceutical care questions. The frequency of all of these grading parameters, except quizzes, was variable because students were randomly chosen to participate. Some students had more evaluations than others. Students receive the score of their group in the group SOAPE write ups. And finally, their group's peer evaluations and their self evaluation are calculated into the final grade.

REFLECTIONS AND FUTURE CHANGES

This course required an enormous amount of faculty time. Because of the subjective nature in evaluating interviewing and communication skills there were always two faculty performing these evaluations. There was also another faculty member who served to keep the group interviews progressing in an orderly and timely fashion. Working with many faculty to help them prepare their cases and instruct them on how to role play the part was also time consuming. However, despite the time involvement, we view this course as a major success. Feedback from students has been very positive. We have received unsolicited comments from our clerkship faculty that many students who took this course seem to be performing better than students from prior years before this course was offered. Obviously, this is not a scientific collection of outcome measures from this course, but it is encouraging.

We feel that this course teaches students that rarely are there “black and white” answers to drug-related problems. They begin to appreciate that medical information is subject to interpretation and that information which is correct today may be replaced by newer theories or concepts tomorrow. They learn that one's individual perspective can determine what course of action is chosen. It reminds them that there may be more than one correct answer to a drug-related problem and teaches the importance of being able to justify, using appropriate literature, recommendation which are made. In short, it eased the rough transition from classroom learning to experiential learning which occurred often before institution of this course.

As the course progressed we identified several areas of needed improvement. One of these was the lack of feedback to the students on the pharmaceutical care plans. We will increase the time allotted for each case to four days, with the fourth day consisting of a formative review and class discussion of SOAPE therapeutic plans and data gathering techniques used for the case. We found that there also needed to be more time per student within each class for interviewing, with fewer groups involved in the process.

Am. J. Pharm. Educ., **58**, 61-64(1994); received 1/3/94.

References

(1) Commission to Implement Change in Pharmaceutical Education. "Background Paper II: Entry-level, curricular outcomes, curricular content and educational process," American Association of Colleges of Pharmacy, Alexandria VA (1991); see also *Am. J. Pharm. Educ.,* **57,** 377-385(1993).

(2) Chalmers, R.K. *et al.,* "AACP Focus Group on Liberalization of the Professional Curriculum. Report 1: Ability-based Outcome Goals for the Professional Curriculum," *ibid.,* **56**, 304-309(1992).

(3) Herfindal, E.T., Gourley, D.R. and Hart, L.L., *Workbook for Clinical Pharmacy and Therapeutics*, 5th ed., Williams and Wilkins, Baltimore MD (1992).

APPENDIX A.

Pharmaceutical Care Questions

1. What don't you know/understand; and therefore, what information do you need?
2. Where will you get this information?
3. What do you think is the drug-related problem(s) [DRP(s)]?
4. What then, are the patient’s signs and/or symptoms of the DRP(s)?
5. What are your desired therapeutic outcomes for each DRP you identified?
6. What are your various therapeutic alternatives?
7. Which therapeutic intervention did you choose?
8. Why did you choose your therapeutic intervention?
9. Describe your pharmacotherapy monitoring plan.
   a) What patient outcomes will you be monitoring?
   b) How and how often will you measure or obtain those outcomes?

APPENDIX B. COURSE ACTIVITIES SUMMARY

MONDAY	WEDNESDAY	FRIDAY
Questions about last week's case can be proposed and answered. Students gather in groups Random selection of a student from each group to interview a patient or	Students meet in groups and review any new informat ion they found about case scenario from each other. Another student is randomly selected from each group to be the group's interviewing	Groups turn in their written therapeutic care plan. Each student turns in their self and peer evaluations, if appropriate. One student is randomly selected from each group to present and defend their group's thera-

MONDAY

physician. Selected students turn in pharmaceutical care questions 1-4.

Students work on the case in their groups comparing each other's answers to the pharmaceut ical care study questions. Students help prepare spokesperson for interviewing and patient assessment.

Groups can assign members various roles and activities to prepare for Wednesdays activities.

Group spokesperson asks faculty their role playing questions to further assess the patient and case.

WEDNESDAY

spokesperson.

Group members continue to work on case scenario, discussing and planning inter viewing questions, assigning members tasks to look up and report new information and scheduling other work times.

Students begin planning for the group therapeutic care plan write-up. This group written plan is turned in at the start of class on Friday.

Group spokesperson asks faculty their role playing quest ions to further assess the patient

FRIDAY

peutic care plan for the patient. Each student is asked at least one question and a follow up question.

All students take the case-specific test. This test is ten multiple choice questions about the specifics of this week's case scenario. After the test is turned in each student receives:

1. quiz answers
2. faculty asessment and SOAPE note
3. next week's case scenario
4. new group assignments, if appropriate.

Faculty give the students their performance eval-

MONDAY

Each group spokesperson has two minutes, then the next group asks their questions. Group members need to listen to all questions and responses to determine if they are getting the information they need to assess the patient and case scenario.

Faculty give interviewers their Perfor mance evaluation.

WEDNESDAY

and case. Each group spokesperson has two minutes, then the next group asks their question. Group members need to listen to all questions and responses to determine if they are getting the information they need to assess the patient and case.

Every other Wednesday, each student is given the group dynamics peer evaluation form to complete at home to turn in at the start of Friday's class

Faculty give interviewers their performance evaluation.

FRIDAY

uation on the oral defense of the therapeutic plan.