

Problem-Based Learning in Pharmacy Management

Mei-Jen Ho
Carmen Kirkness
Diana Brixner

ABSTRACT. The development and implementation of a modified problem-based learning (PBL) exercise in a pharmacy management course for Doctor of Pharmacy candidates at the University of Utah is described in this article. This course used a combination of didactic lectures, group projects, and individual reports to aid students in developing essential management skills. Teams comprising 5 to 6 students were given four real-life scenarios to develop a plan for managing a hypothetical managed care organization (MCO). Students also prepared reports describing their position and contributions to the success of their MCO. The outcome of this exercise for each team was an annual report, which included their MCO's organizational structure, mission and vision, financial statements, and various clinical and community services. After the reports were evaluated, the team with the best annual report presented a poster presentation at the American Pharmacists Association (APhA) annual meeting. The use of PBL allowed students to develop lifelong skills for management. Although management skills cannot be

Mei-Jen Ho, Pharm.D., MSPH, is Pharmacy Informatics Resident, University Hospital and Clinics; Carmen Kirkness, M.Sc., P.T., is Research Associate; and Diana Brixner, Ph.D., R.Ph., is Associate Professor and Chair, Department of Pharmacotherapy, College of Pharmacy, University of Utah.

Address correspondence to: Diana Brixner, Ph.D., R.Ph., Associate Professor and Chair for Department of Pharmacotherapy, 30 South 2000 East Room 258, Salt Lake City, UT 84112 (E-mail: dbrixner@hsc.utah.edu).

Journal of Pharmacy Teaching, Vol. 13(2) 2006
Available online at <http://jpt.haworthpress.com>
© 2006 by The Haworth Press, Inc. All rights reserved.
doi:10.1300/J060v13n02_04

taught overnight, this course provided students with a solid foundation of management skills for the future. doi:10.1300/J060v13n02_04 [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.Haworth Press.com>> © 2006 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. Pharmacy, management, problem-based learning

INTRODUCTION

Pharmacy practice has slowly been transformed from traditional distributive functions to more clinically orientated patient care roles. In response to these new roles, educational requirements (i.e., the Doctor of Pharmacy (Pharm.D.) degree) and approaches to pedagogy in colleges of pharmacy have changed. It is no longer sufficient to teach pharmacy knowledge without translating these skills actually used in practice. Pharmacy schools are placing more emphasis on patient care skills such as counseling and communicating with other health care professionals. Active teaching and learning methodologies adopted from cognitive science research have been incorporated into pharmacy curricula to prepare students for this dynamic field.

Problem-based learning (PBL) is a teaching strategy which asks students to translate knowledge traditionally gained through lectures and readings into real-world situations. Problem-based learning was created as an alternative instructional method to prepare medical students for situations they will face in practice (1, 2). Practice skills are reinforced through independent and group projects facilitated by medical practitioners during the course. In contrast to “traditional” learning methods that emphasize memorizing and reciting knowledge, students who learn using PBL apply the necessary skills in a supervised realistic setting through a case study or scenario. Scenarios are designed to mimic the wide variety of clinical challenges that the new practitioners face after graduation. They prepare students to assess clinical cases that may not follow traditional textbook signs and symptoms. More importantly, this environment allows students to work with peers as they would on an interdisciplinary team on clinical rounds. The use of PBL is prevalent across health care programs, including nursing and pharmacy (3, 4).

Historically, traditional lecture-based learning methods have been considered the “gold standard” for medical education. The introduction

of the PBL method requires evaluations to ensure that knowledge acquisition is at least equal to traditional lecture-based learning. A pre- and post-comparison of didactic and PBL formats for teaching pre-clinical obstetrics and gynecology students found that students enrolled in a PBL course performed better on exams than those enrolled in a didactic format (4). However, at another institution, PBL did not differ from traditional learning in the students' test scores (5). Both studies demonstrated students using the PBL format found greater satisfaction, enjoyment, and sense of educational stimulation than those taught in the traditional didactic format (4, 5).

Evaluating the effectiveness of PBL has been difficult to summarize as most of the evaluative work to date has relied on traditional tests of content knowledge to compare PBL with traditional didactic learning (6). For example, if the assessment is recalling facts, then PBL is unlikely to show effectiveness (7). Therefore, student evaluation using multiple choice formats may only test a student's ability to retain factual information, but this may not be an adequate assessment of in-depth knowledge compared with an essay format (8, 9).

The lack of consistency in the implementation of the PBL format has also served to make evaluating the effectiveness of PBL challenging. The PBL format can vary within an institution and across institutions (i.e., one institution may have only one PBL course whereas another may integrate PBL across all courses). The myriad of variables that influence one program may not necessarily influence another program and therefore not truly represent knowledge acquisition when evaluated. To overcome this problem, an in-depth description of the program is suggested to understand the PBL format (10).

Pharmacy programs have adopted PBL in pharmaceuticals (11), clinical therapeutics, medicinal chemistry, pharmacokinetics, and pharmacology (12). As pharmacy courses become more interdisciplinary, pharmacy management courses have also used PBL as an instructional tool. One institution taught pharmacy managerial skills in five components: assessment, learning, analysis, practice, and application based on Social Cognitive Theory (13). Although management skills cannot be perfected during a semester long course, this course provided students with a starting point to develop and improve their existing management skills. In Japan, a pharmacy program used clinical cases in small groups for students to become familiar with disease states and treatment. Problem-based learning was found to be effective in helping students acquire knowledge while motivating them to become independent learners (14).

The concept of teaching the principles of managed care pharmacy is relatively new to the profession. A managed care organization (MCO) is a health care provider designed to provide a wide variety of health care services to enrolled members through a select number of providers. It improves and assures accessibility of health care, including pharmaceutical care, while containing costs (15). Pharmacists are a crucial part of an MCO by providing drug therapy and patient care services. A pharmacist's role in an MCO may also include health outcomes research, drug utilization review, disease management, cost analysis programs, and pharmacy benefit design. These pharmacists are often asked to qualify and quantify the results of different therapies and programs, and determine the value of such programs to the health care team.

The MCO model can be used to introduce many important roles of today's pharmacist, including those in practice management. Practice management courses in colleges of pharmacy traditionally provide didactic lectures on various management topics. Students' grades in these courses are generally based on their ability to memorize what they have learned and repeat the material back on multiple choice exams or written essays. Problem-based learning can be used to expose students to practice management problems pharmacists encounter on a daily basis. The goal of using PBL to teach pharmacy practice management is to teach the same topics covered in a traditional lecture-based format, but also encourage students to find and analyze information from various sources, engage in self-directed study, effectively communicate with others, and work productively with a group of peers (3). This approach changes previously passive-learning students to an active-learning environment.

The objective of this article is to describe the introduction of a modified PBL model into a Pharmacy Management course offered to Doctor of Pharmacy candidates at the University of Utah, College of Pharmacy.

METHODS

The Pharmacy Management course is an introductory core class for pharmacy students. The course focuses on the various managerial roles available in pharmacy practice based on experiences from experts in the field. At the University of Utah, the course had typically been taught during the fall semester of the third professional year of the Pharm.D. program. However, in 2005, the College of Pharmacy transitioned from offering both a Bachelors of Science in Pharmacy and the Pharm.D. to offering only the Pharm.D. degree. Since the transition, the Pharmacy

Management course has been incorporated into the curriculum of the second professional year. In 2004, as a result of this transition, two pharmacy classes (one second year, one third year) were combined into one class with 86 students. The results presented in this article were from the course taught in fall 2004.

This class met once a week for 1 and 1/2 hours for 11 weeks during the semester. Of the 11 class meetings during the semester, most involved lecturers in a didactic format. Only one class meeting was scheduled for group work (i.e., establish groups, set roles). Once formed, student groups performed most of their work outside of class time. The groups independently chose how often to meet, length of time for the meeting, and were responsible for arranging their own facilitator. Three facilitators and one post-doctoral fellow were available resources for the students.

Course Outline

The course comprised three student assessment components: an *Annual Report*, four *Crisis Management Reports*, and an *Individual Report*. Each group developed an *Annual Report* that was presented as a written report at the end of the semester. Throughout the semester, each group also provided *Crisis Management Reports* for four scenarios which typically occur in managed care settings. Finally, all students were required to complete an *Individual Report* based on their roles in their groups for the projects.

Didactic Course Overview

To better understand managerial roles available to pharmacists, the didactic topics focused on the overall structure of a managed care organization, managerial roles in various practice settings, and special interest seminars that have an impact on pharmacy practice (Table 1).

Guest lecturers who hold managerial positions in various sectors of pharmacy practice were invited to illustrate how management principles are applied in their practice settings. The lecturers included pharmacists from community and hospital pharmacies, pharmacy benefit managers (PBM), managed care organizations (MCOs), pharmaceutical industry, pharmacy and therapeutic committees, pharmacy foundations, and professional organizations. The guest lecturers provided different perspectives to emerging issues including rising prescription costs, the introduction of Medicare Part D, and reimportation of prescription drugs.

TABLE 1. Course Outline

Lecture Topics
Managed Care Organization
Managed Care Organization Structure
Pharmacy Management in Integrated Systems
Pharmacy Benefit Management
Pharmacy Management
Independent Pharmacy
Chain Pharmacy
Hospital Pharmacy
Pharmaceutical Industry
Special Topics
Pharmacy Benefits for Medicare/Medicaid Patients
Staffing Issues: Recruitment, Retention, and Performance Management
Formulary Management
Pharmacoeconomics
Values of Pharmaceuticals
Reimportation

Overview of Groups

The group project required groups of students to develop and organize a managed care organization. The class was randomly divided into 15 groups of 5-6 second and third year students. Each MCO had six executive roles as described in Table 2. Each group member chose an executive role; those groups with five members omitted the role for a pharmacy store director. The executive roles were developed with the intent that each member would make decisions for different aspects of their organization. These roles provided a framework whereby each member could identify learning issues, gather information, share information, work together, and make decisions as a team.

The group was charged to work together to generate ideas and possible solutions to the issues presented in the scenarios. Each group was to obtain the available information and ascertain where more information was needed. Tasks were then divided among group members in an effort to create an Annual Report for the MCO.

TABLE 2. Description of the Executive Functions of Each Managerial Position

Title	Description
Chief Executive Officer for the Managed Care Organization	<ul style="list-style-type: none"> • Oversees the success of the company • Responsible for the operation of the plan in a competitive market • Leads the overall cohesive of the team
Chief Executive Officer for the Pharmacy Benefit Management	<ul style="list-style-type: none"> • Responsible for the design and management of the pharmacy benefit program for the members of the MCO • Oversees the negotiation process for optimal pharmacy utilization including preferred pharmacies and specialty networks
Vice President for Pharmacy Benefit Management	<ul style="list-style-type: none"> • Responsible for pharmacy operations including the contracting strategies with pharmaceutical companies • Leads the pharmacy and therapeutic committee for formulary management
Pharmacy Stores Director	<ul style="list-style-type: none"> • Negotiates with PBM on rebates and dispensing fees on behalf of the independent and chain pharmacies • Responsible for staffing
Chief Executive Officer for the Hospital	<ul style="list-style-type: none"> • Responsible for hospital management • Oversees contracts for hospital services for MCO members
Vice President for Human Resources	<ul style="list-style-type: none"> • Staffing, recruitment, retention • Professional development and performance management

Managed Care Organization Scenarios

During the semester, each group faced four scenarios that commonly confront MCOs. The scenarios were designed for students to develop skills to work cohesively in team settings, effectively exchange information between team members, and to come to a common resolution. Students also had to meet the external challenges faced by many organizations such as meeting deadlines, compromising to different ideas, and working towards the common goals of an MCO. Students were given a set of core references including articles, textbooks, and Web sites to guide the process. Students were also encouraged to use outside resources, the guest lecturers, and the facilitators as mentors.

In the first scenario, each group had to develop an MCO for a specific population and design a report that included a concise description of the anticipated patient population, size of the plan, plan design, market share, and average premium per member. In this scenario, students had the opportunity to explore Web sites for MCOs in the state, determine the population most in need, and design a plan that would be mutually beneficial for members and the health plan. This assignment encouraged students to be creative in business strategies based on their research.

The second scenario examined issues regarding pharmacy benefit managers (PBMs). Students had to design and implement structures of their internal PBM for the MCO. Students described the roles that community pharmacies, payers, customers, and pharmaceutical manufacturers each play in the delivery of medications to patients. Each group developed a model reimbursement formula and economic strategies given the financial implications of operating a PBM. This allowed students to understand the role of PBMs and the reimbursement strategies within MCOs.

The third scenario was designed for students to understand the demands of community pharmacists. Students had to develop a plan to deal with increased pharmacist turnover and the pharmacist shortage across the state. Each group designed a recruitment plan with incentives such as better quality of life, financial rewards, and career development opportunities to retain and recruit pharmacists. As potential managers of community pharmacies in the future, students reflected on their previous job experiences for guidance in developing an optimal work environment. Each group also incorporated the employers' perspective from the guest lecturers. Although students were introduced to many benefit designs, most groups had innovative plans for increasing employee satisfaction. This exercise allowed students to understand the delicate balance between employer and employee satisfaction. A sample scenario is shown in Table 3.

The final scenario gave students opportunities to utilize pharmacoeconomic principles to determine the value of a specific drug for their organization. A medical liaison from a pharmaceutical company presented a seminar that was intended for the decision makers of actual MCOs in the area. Each group had to decide whether the information was objective, what potential impact the drug may have if included on their formulary, and present a short report based on pharmacoeconomic principles as to whether the product provided better value than other products on the market. Students applied clinical information from their

TABLE 3. Sample Crisis Assignment

Dear MCO Executives,

At a recent executive meeting the VP of HR presented some rather alarming data regarding increased employee turnover rate at the primary contracted retail chain providing prescription services to the MCO members.

1. The Director of the retail stores has been asked to provide a report describing the reasons for the increased turnover.
2. The HR VP and the Retail Stores Director all also expected to provide a plan for turning the trend around.
3. In addition a discussion is requested of why this turn around may be happening in the chain drug stores vs. the independent drug stores.

The report is expected to be brief but yet concise and is expected to be roughly two pages. The good news is that because all the MCO CEOs have a leadership meeting in Germany for the next 10 days, the report is not due until Monday November 1.

therapeutics courses and performed incremental cost-effectiveness calculations. A variety of outcome measures were used including hospitalizations, success rates, and indicators for improvement in quality of life.

Annual Report

The scenarios prepared by each group were organized so that the information they gathered could be included in an Annual Report for their MCO. The Annual Report included an introduction to the organization, a business report, an organizational structure, a description of pharmacy benefits, key highlights for the year, community service, and forecasting for the future. Students were encouraged to be creative, but a sample outline for the Annual Report was provided as shown in Table 4. The objective of this report was for students to insert various pieces of information from their lecturers and group scenarios during the semester into one cohesive document. As an organization, the students determined what they considered important for a successful business. The report is a compilation of everything taught in the course.

Individual Report

One of the challenges of a group project is that a few students may perform most of the work. An individual report based on each student's specific position within their MCO was required to encourage student autonomy. A description of each report requirement is listed in Table 5.

TABLE 4. Annual Report Outline

Annual Report Outline
<ul style="list-style-type: none"> • Cover • Mission Statement • Message to the shareholders • Highlight key events during the year • Highlights from the financial report • Business <ul style="list-style-type: none"> • Overview • Describe the health industry • Uniqueness of this organization • Strategies for success • Administration <ul style="list-style-type: none"> • Description of each executive leader in the group • Staffing/Retention/Development for employees • Overview of the organization <ul style="list-style-type: none"> • Describe the contractual relationships <ul style="list-style-type: none"> • Retail stores • Hospitals • Medical Groups • Programs offered • Description of each clinical management services <ul style="list-style-type: none"> • Prospective and retrospective drug utilization review • Pharmacy Benefit <ul style="list-style-type: none"> • Benefit design • Contracts/rebates with pharmaceutical companies • Formulary • Drug utilization review (prospective and retrospective) • Results of operations • Highlight financial summary for the year • Methods to control costs • Risk factors to the business • Community Activities <ul style="list-style-type: none"> • How does your organization contribute to the community • Charity care? • Patient management programs? (Flu Shots, AIDS awareness) • Forecasting <ul style="list-style-type: none"> • Looking Ahead • Health care utilization projection

 Annual Report Outline

- Pharmacoeconomics/outcomes
 - 2006 Medicare Prescription Program
 - Guarantees and contractual obligations
-

TABLE 5. Brief Description of Individual Report

Title	Individual Assignment Description
Chief Executive Officer for the Managed Care Organization	<ul style="list-style-type: none"> • Description of current MCOs in Utah • Organization structure and description of the MCO and how it is unique from other MCOs in Utah
Chief Executive Officer for the Pharmacy Benefit Management	<ul style="list-style-type: none"> • Description of two national PBM's organization structure • Discussion on how an internal PBM benefits MCO • Description of contracting plans with manufacturers, pharmacy stores, and managed care plans • Discussion of the current controversies with an internal PBM
Vice President for Pharmacy Benefit Management	<ul style="list-style-type: none"> • Evaluate the value of PBMs • Discuss the proposed National Legislation to control the PBMs contracting strategies with pharmaceutical companies • Compares a national PBM and the group's PBM formulary process
Pharmacy Stores Director	<ul style="list-style-type: none"> • Describe the trends for chain drug stores in Utah and nationally • Prepare a transcript for the group's decision to address Medicare Discount Card Program
Chief Executive Officer for the Hospital	<ul style="list-style-type: none"> • Describe hospital systems nationally and specifically within Utah • Description of important traits to become a top 10 hospital • Review hospital contracting strategies with MCOs • Describe the dispute between United Healthcare and the University of Utah
Vice President for Human Resources	<ul style="list-style-type: none"> • Description of recruitment, retention, employee development, and performance management • Develop an employee plan for the MCO

The objective of each individual report was to allow each student to conduct independent research and contribute to their specialized area in the final report. Essentially, this enabled each student to become an expert in the group and provide specific information for the annual report.

Each individual report comprised two sections. The first section required students to examine current issues in pharmacy practice either in the state of Utah or nationally. Students were to follow trends in pharmacy practice, current events, and research prior to resolving the problem. The second section required students to synthesize what they found and implement their ideas into their MCOs. The key for the individual reports was for students to recognize the critical issues surrounding their positions and influence the operation of the MCO through their executive position. For example, the Vice President of Human Resources was expected to develop a performance management plan for the employees of the MCO.

Assessment

Students were assessed on their individual and group projects based on the annual report outline (Table 4). Students were given objectives and guidelines for each assignment. Students were given full credit for identifying pertinent information needed for each objective. Comments were provided on all papers, and grading reflected how the students tried to answer each question. All students were given a chance to resubmit the paper to improve their grade. Group projects received group grading while individual projects received individual grading. There were no midterm or final exams for this course.

At the end of the semester, student evaluations regarding their opinions of the course objectives, content, materials, assignments, and course effectiveness were gathered using a multiple choice questionnaire format. The students used one evaluation which applied to all of the course assignments. The top five strengths and weaknesses of the course were itemized using a 4-point scale (Strongly agree, Agree, Disagree, Strongly disagree).

RESULTS

Student Assessment

The individual report and group projects were assessed based on completion and research of the required components for the report/project

(Tables 4 & 5). In the individual report, students described their contribution. The students were graded based on their innovative ideas to deal with problems in their area based on evidence from literature or experiences from the speakers.

The group projects were assessed based on their ability to identify a group of Utahns without pharmacy benefits, and their strategies to provide pharmaceutical care. The report should identify a good case and justify a reasonable method to gain revenues for their business. A final part of the report is also to demonstrate how pharmacists improve health care delivery.

Course Assessment

The course survey described the combined concern of students with the value of the materials taught in pharmacy management in general and a lack of familiarity with a PBL approach in the pharmacy curriculum. The results summarize the written comments that the students had regarding the Pharmacy Management course. There was a 98% response rate for the written and multiple choice questionnaires.

The written comments provided by the students focused on a perceived vagueness of the assignments and how they felt they were expected to have more knowledge on the topic area than they indeed possessed or were able to grasp. The major assignment seemed so different from assignments in other classes that the students found it difficult to know what to do. This was substantiated by many comments such as: "I felt I was supposed to describe things that I had never heard of before, had barely been introduced to and with which I had not one iota of experience."

In addition, students found working in a group setting to be demanding. Comments were made such as: "This course was a good contrast to more didactic courses" and "working in groups is sometimes challenging, but is always a good experience and you learn a lot about team work which is important in the health care field." Some students felt they were only able to focus on their area, but gained little understanding about other functions of an MCO from other peers in their group. Some students did not try to incorporate the other positions if the information did not relate to their individual project. This may be a result of spending so much time on their own segment or because there was no formal evaluation (i.e., written test); therefore, there was no incentive to do so to improve their grade. Some students had difficulty working in a group setting as they found group work does not necessarily reflect the

individual. Others found group assignments were a good idea as it allowed students to discuss topics and share ideas.

Overall, the students found the class size was too big which made it difficult to stay focused. Also, the combination of two professional years of students (one second year, another third year) into one class made scheduling group meetings a challenge as all group members were not on the same course schedule.

Assessing how students took responsibility for their learning was provided by reviewing the student satisfaction with the course content. There was mixed feedback as many students thought the learning acquired was not what the students wanted or expected from a course titled "Pharmacy Management." These students wanted course objectives to be focused on how to manage a pharmacy: accounting, marketing, legal and human resource questions, and for someone to "provide them with this information." These areas of study reflect a more traditional method of learning commonly found in lecture-based courses. Other students complemented the content by suggesting that the course covered material that was useful, interesting, and informative and provided a good background on many aspects of pharmacy practice.

Student responses to the multiple choice portion of the course evaluation appear to validate their written comments (see Table 6). The students had generally split opinions that the course was organized and helpful material was available but the students also noted the assignments and effectiveness of the course did not meet their needs.

DISCUSSION

The purpose of this PBL experience was to use "real-world" scenarios to develop thinking and problem-solving skills necessary to acquire

TABLE 6. The Agreement and Disagreement of the Students' Multiple Choice Evaluation of the Pharmacy Management Course (n = 84)

Multiple Choice Question Asked:	Agree n (%)	Disagree n (%)
Course objectives met	45 (54)	39 (46)
Course content organized	50 (60)	34 (40)
Course materials helpful	43 (51)	41 (49)
Assignment and exam reflect course	37 (44)	47 (56)
Effective course	29 (35)	55 (65)

the essential concepts of a Pharmacy Management course. The course received mixed feedback, and several challenges emerged during the semester.

This course did not follow authentic PBL principles including all aspects of PBL because of large class size and logistic issues. This course utilized lectures rather than group learning with one instructor for didactic instruction due to the large class size. The new format for this course encouraged cooperative learning through a group environment. However, an outline of what to include in the reports was used to guide students instead of just finishing a problem because we wanted to standardize what students learned in the project. A guideline of work was used to facilitate the general framework of the groups. Since there was a mixture of two Pharm.D. classes, it was decided to assign specific position by the instructors rather than letting the group decide in the beginning. However, some assignments such as the scenarios were divided by the group.

The first challenge was providing students with the necessary background information to understand and complete these assignments. This course was students' first exposure to pharmacy in a global scope outside of medicine. Students had a hard time incorporating how the organizational structure and business perspective related to pharmacy practice. The students found the task of managing an MCO was beyond their imagination, that the interactive learning process got blocked and that the learning objective should be changed to focus on how to complete the assignment. In the future, this course will be taught earlier in the pharmacy curriculum so students are not consumed by the therapeutic and chemistry aspects of the pharmacy curriculum and can visualize the global aspect of pharmacy practice. However, offering the course prior to the students understanding the larger scope of their profession may also be problematic.

Another challenge was the large class size due to the mixture of the two Pharm.D. classes. There was a large demand on student time to meet outside of class which was confounded by the students being in two different time schedules. A smaller-sized class would allow individual attention with the instructors, perhaps enabling group meeting during the class time so that instructors can act as facilitators and assist students in setting learning issues, aspects of a problem they don't understand, and assist students in prioritizing learning issues. Although we encouraged team meetings with the instructor during the semester, it was difficult for many different groups due to large class size. Students and instructors could also discuss what resources will be needed in order to

research the learning issues, and where they could be found. A small group with a facilitator would encourage group sharing and learning and perhaps provide timely direction so the students do not get frustrated and lose interest in what they are learning. It may even help to have students teach their group members what they have learned using the small group to facilitate or have small group presentations to the whole group throughout the course. A large-sized class inhibited many of these actions from taking place as the resources were not available for this size of group. Since the curriculum has now transitioned, future classes will only be half the size at the time of this report. Increasing the available resources was limited due to financial constraints; therefore, the smaller-sized class makes the resources such as facilitators, physical class space, and consulting personnel, easier for the students to gain access to.

PBL involves a learning curve of how to be a self-directed learner. This course was most students' first exposure to PBL and it was the only course that used this format at our college of pharmacy. The difference in styles of learning between traditional didactic lectures and PBL may have also been a reason for part of the frustration and confusion felt by many students. This is admittedly difficult when the applications are cases in the classroom and not actual problems in the workplace.

An additional challenge of applying PBL to Pharmacy Management is that the topic is very dynamic. In fact, in each of the years that the course has been taught, the content and its presentation to the students have changed. Based on what we learned in 2004, the assignments for the students taking this course in 2005 were changed. The MCO Annual Report was changed to an individual business plan, and there was an increased focus on inventory management and Medicare Part D. The business plan allowed students to pick a topic perceived as more potentially relevant to their own interests and potential practice area upon graduation. The groups were not repeated as too many challenges arose by group-based assignments. The PBL approach was maintained through the use and application of knowledge from didactic lectures and guest speakers towards the business plan. The assessment of the students has been modified to the following: the business plan has two sections that are evaluated during the semester (one in the first-half and the second in the second-half) and an overall plan that is reported at the end of semester. The four crisis scenarios have been reduced to three and there are no individual reports. Also in 2005, the number of students in the course was limited to 50, which substantially reduced the strain on resource use and time commitment by the faculty and students; disadvantages often

stated in the PBL literature (8). We hope to report on the continued iterations in teaching pharmacy management in future reports.

Limitations

Assessment of authentic learning experiences is a controversial part of the literature surrounding PBL. It is difficult to devise a strictly objective means of assessing student performance in learning material. In addition, Pharmacy Management is a difficult course to separate the perceived relevance of the material taught versus the methods utilized to teach the course.

CONCLUSIONS

The purpose of this article was to describe the first experience of implementing problem-based learning in a Pharmacy Management course at the University of Utah. This course was designed to introduce pharmacy students to the importance of different organization roles in pharmacy practice and how the roles are all integral parts of pharmacy. The use of PBL allows students to develop valuable skills for management in the future. Although management skills cannot be taught overnight, this course provided them with the basic skills needed to adapt to management situations in the future.

Received: February 28, 2006

Reviewed: April 7, 2006

Revised: July 20, 2006

Reviewed and Accepted: September 20, 2006

REFERENCES

1. Barrows HS. A taxonomy of problem-based learning methods. *Med Educ.* Nov 1986; 20(6):481-486.
2. Barrows HS, Mitchell DL. An innovative course in undergraduate neuroscience. Experiment in problem-based learning with "problem boxes." *Br J Med Educ.* Dec 1975; 9(4):223-230.
3. Schmidt HG, Vermeulen L, van der Molen HT. Longterm effects of problem-based learning: A comparison of competencies acquired by graduates of a problem-based and a conventional medical school. *Med Educ.* Jun 2006; 40(6):562-567.

4. Casey PM, Magrane D, Lesnick TG. Improved performance and student satisfaction after implementation of a problem-based preclinical obstetrics and gynecology curriculum. *Am J Obstet Gynecol*. Nov 2005; 193(5):1874-1878.
5. Fischer RL, Jacobs SL, Herbert WN. Small-group discussion versus lecture format for third-year students in obstetrics and gynecology. *Obstet Gynecol*. Aug 2004; 104(2):349-353.
6. Nendaz MR, Tekian A. Assessment in problem-based learning medical schools: A literature review. *Teaching and Learning in Medicine*. 1999; 11(4):232-243.
7. Wood DF. ABC of Learning and teaching in medicine: Problem based learning. *BMJ*. 2003; 326:328-330.
8. Albanese MA, Mitchell S. Problem-based learning: A review of literature on its outcomes and implementation issues. *Acad Med*. Jan 1993; 68(1):52-81.
9. Antepohl W, Herzig S. Problem-based learning versus lecture-based learning in a course of basic pharmacology: A controlled, randomized study. *Med Educ*. Feb 1999; 33(2):106-113.
10. Distlehorst LH, Robbs RS. A comparison of problem-based learning and standard curriculum students: Three years of retrospective data. *Teaching and Learning in Medicine*. 1998; 10(3):131-137.
11. Romero R, Eriksen S, Haworth I. A decade of teaching pharmaceuticals using case studies and problem-based learning. *Am J of Pharm Educ*. 2004; 68(2):1-9.
12. Lubawy W, Brandt B. A variable structure, less resource intensive modification of problem-based learning for pharmacology instruction to health science students. *Naunyn-Schmiedeberg's Arch Pharmacol*. 2002; 366:45-87.
13. Latif D. A management skills course for pharmacy students. *Am J of Pharm Educ*. 2004; 68(1):1-10.
14. Sekiguchi M, Yamato I, Kato T, Torigoe K. A trial of the PBL method in the first one year of pharmacy—Effects and issues. *Yakugaku Zasshi*. Jan 2004; 124(1): 37-42.
15. Managed Care Pharmacy American Association of Colleges of Pharmacy. Available at: <http://www.aacp.org/site/tertiary.asp?TRACKID=www.google.com/search?hl=en&lr=&q=managed+ca&VID=2&CID=920&DID=3679>. Accessed May 20, 2006.

doi:10.1300/J060v13n02_04