Implementing Problem-Based Learning with WWW Support in an Introductory Pharmaceutical Care Course

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This project was undertaken to increase active learning opportunities in the course, “Introduction to Pharmaceutical Care” and to introduce problem-based learning (PBL) to the College of Pharmacy. Training was designed to introduce students to PBL and to prepare faculty to facilitate PBL groups. Communication was facilitated by WebCT World Wide Web Course Tools support. The project was well-received by both students and faculty. Students responded positively to the PBL experience and were found to perform as well in the course as the preceding class, which had no PBL experience. Faculty members who participated in training sessions and facilitated groups indicated they would be willing to facilitate again in the future. Anticipated logistic and organizational problems were overcome. As a result, PBL is likely to become a permanent addition to the course and has been successfully introduced via direct experience to 22 facilitators.

INTRODUCTION

Delivering pharmaceutical care to individual patients is an active process. Working with patients, their caregivers, and other health professionals, pharmacists actively recommend, implement, monitor, and assess drug therapy and its outcomes.

At The University of Iowa College of Pharmacy, the practice philosophy of pharmaceutical care is introduced to students in the first course in the curriculum, “Introduction to Pharmaceutical Care.” Since it was first taught in 1993, it has evolved into a course which exposes students to high ideals of professional pharmacy practice. Topics include an introduction to:

1. pharmaceutical care practice philosophy.
2. communication skills and the nature of the pharmacist-patient relationship in the practice of pharmaceutical care.
3. drug therapy problems (DTPs) and how they can be categorized.
4. identification and resolution of DTPs within the context of patient cases.
5. tertiary drug information resources.
6. documentation of pharmacists’ interventions in the SOAP format.
7. orientation to the health science library and health science resources on campus.

Prior to 1997, the primary instructional strategies for a typical class size of 105 to 110 students were lectures, two case discussion sessions, and one communications skill-building laboratory session. Students learned to use selected tertiary drug information sources by listening to lectures and by completing written assignments about each reference. Two cases provided the context for a role play activity in which students practiced communication and data collection skills. Prior to each case, members of the clinical, medicinal chemistry, and pharmaceutics faculties co-presented a lecture which provided students with information about the pathophysiology, medicinal chemistry, pharmaceutics, and pharmacotherapy relevant to each case. Later in the course, students worked independently with each case to identify drug therapy problems, obtain drug information, formulate solutions to the problems, and write a note in the SOAP format to document their planned interventions. The instructor (JDC) and other faculty members led groups of approximately 20 students in a discussion of each case, the associated drug therapy problems, and approaches to problem-solving and documentation.

The course instructor believed that the aforementioned course content provided the beginning student with a sound introduction to the knowledge, attitudes, and skills needed to deliver pharmaceutical care. However, he also believed that to acquire the skills needed to provide pharmaceutical care, students must be actively engaged learners in an instructional environment that fosters
acquisition of these skills. The large lecture format in which most of the course was delivered prior to 1997 provided limited opportunities for students to actively practice the problem-solving skills he taught.

During the summer of 1997, the instructor considered how the course could be redesigned to provide opportunities for all students to actively participate in drug therapy problem-solving discussions related to the 2 cases. He collaborated closely with the director of the College of Pharmacy Teaching Center (CMC) and with other faculty members who had previously presented lectures in the course, especially the drug information lectures.

Simultaneously, the University of Iowa launched its "new Technology in the Learning Environment" (nTITLE) program which provided training for University faculty members to learn to use WebCT World Wide Web course delivery software and to incorporate it into their courses. The instructor, who has a strong interest in electronic technology, participated in the program and integrated WebCT into the redesigned course.

This description would be incomplete without stating that the authors recognized that instructional innovation is often regarded as difficult and risky in an academic environment which is perceived to reward scholarship more than it rewards teaching. The changes they implemented could not have been undertaken without the voluntary participation of many faculty members. As they proceeded with plans to redesign Introduction to Pharmaceutical Care, they became aware that their degree of success in introducing problem-based learning and WebCT to the College would influence the willingness of other faculty members to adopt new technology and instructional methods.

PROBLEM-BASED LEARNING

Problem-based learning (PBL) is a well known instructional method that has gained popularity in health professions education during the past 25 years. The authors devoted time to learning about PBL and how to implement it from print, video, live presentations, colleagues in the colleges of dentistry and medicine, and World Wide Web resources.

Compared to lecture and discussion, PBL is an instructional method that permits a high degree of inquiry, learner control, and active participation. In general, according to Barrows, PBL fosters activation of prior learning, high motivation to learn, development of self-directed learning skills, and, in the health sciences, cognitive restructuring of new knowledge to be accessible in clinical contexts, and development of effective clinical reasoning skills.

The problem format in PBL may be as simple as a single question or as complex as a community health system. When a patient case is the format, it may be a short vignette, a complete case history, or a simulated or actual patient, depending on the instructional purpose of the case. The case format should be chosen and developed carefully to permit students to identify and explore all the areas of knowledge, attitudes, and skills which the instructor desires them to learn.

A typical presentation for problems is progressive disclosure, which allows students to learn the facts of a case gradually, just as they would by actually collecting information from a patient and accumulating data over a period of time. As each section of a case is revealed, students work together to identify facts and information gaps, propose hypotheses or explanations for facts, and identify areas for further learning or "learning issues.”

In PBL, students participate actively in both teaching and learning. Students are responsible for researching learning issues independently, organizing information, and teaching other students the information, concepts, and procedures related to the learning issue. The instructor or "facilitator" in PBL plays an important role, ideally, guiding the learning process rather than imparting information. Wetzel summarizes and contrasts the activities of students and facilitators in PBL. Students ask questions, suggest hypotheses, present findings from independent study, raise learning issues, and teach other students. Facilitators listen actively, encourage critical thinking, challenge students’ reasoning processes, provide feedback, and guide learning when necessary. In its most sophisticated form, PBL continually challenges students to evaluate not only what they have learned, but also how they have learned it and what processes they have applied to problem resolution.

These attributes of PBL were attractive to the authors as they considered redesigning Introduction to Pharmaceutical Care. They concluded that adopting PBL in the course would create an active learning environment for all students and would provide an appropriate context for students to begin to develop the skills needed to actively evaluate patient data, identify drug therapy problems, and apply a consistent strategy for clinical problem-solving and care planning.

REORGANIZATION OF THE COURSE

Although problem-based learning is well-known in health sciences education, it had never been attempted in the UI College of Pharmacy. The authors encountered skepticism about the ability of both students and faculty members to adapt to PBL. The challenges of redesigning Introduction to Pharmaceutical Care included not only determining which course content to convert to PBL, but also preparing students, recruiting and training faculty members, and ensuring good communication between the instructor, students, and facilitators during PBL. For a time, concerns about the availability of rooms and resources made adoption of PBL seem unlikely; however, these concerns were eventually resolved.

Adapting Course Content to PBL

Prior to 1997, as described in a previous section, the instructor included two case discussions in Introduction to Pharmaceutical Care and was familiar with how typical first-year pharmacy students responded to the cases and how they acquired, evaluated, and reported information. These cases became the focal point of reorganization to implement PBL.

The authors envisioned that PBL, which would theo

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Table I. Contents of the student PBL manual
Definition of problem-based learning.
Description of the PBL group process and agendas for each session.
Definition of a “learning issue.”
Expectations for preparation of written learning issue reports.
Examples of learning issue reports judged to be “unacceptable,” “acceptable,” and “good.”
Instructions for posting learning issue reports on the course WebCT site.
Student responsibilities in the PBL process.
Expectations and grading criteria for student participation.
Role of the facilitator in PBL.
Calendar and group assignments.
A summary chart for drug information resources to be completed by the student.

Preparing Students for PBL
Few students entering the College had experience with PBL. During the fall 1997 semester, only two of 110 students enrolled in the course had previous experience with PBL. The authors considered the characteristics of PBL and the characteristics of typical first-year students and concluded that students would need a training program to prepare them for both PBL and WebCT.

The students’ training consisted of the following components which were delivered throughout the first half of the semester, prior to the beginning of the first case.

1. Introduction to problem-based learning
   On the first day of class, students listened to a 20 minute presentation. The purpose of this presentation was to convey the following messages about PBL:

Table II. Contents of the facilitator’s PBL manual
Photographs of students in the facilitator’s group.
Record sheet for attendance and participation scores.
Record sheet for tracking references used in learning issue report preparation.
General information applicable to all PBL sessions.
Complete agendas, instructions, and target time frames for each session.
Announcements for facilitators.
A facilitator’s copy of the case under discussion.
Anticipated learning issues for the case.
Supplemental information about the case scenario for the facilitator’s use.
A copy of the student manual.
A copy of the lecture handout on identifying and classifying drug therapy problems.
A blank copy of the summary chart for drug information resources.

- Learning is an active process.
- Learning how to provide pharmaceutical care requires the student to be actively engaged in learning.
- Problem-based learning is an activity that can help students learn how to provide pharmaceutical care.
- Students work in groups to respond to a case.
- Students take responsibility for learning together.
- The role of the instructor is to facilitate a group’s learning process.

2. PBL group process and expectations for students
   One week before the first PBL session, students received a 60 minute presentation which described the organization of group sessions and expectations for participation and learning issue report preparation. Students were provided with a manual that contained detailed information about PBL. A list of the contents of the student manual can be found in Table I.

3. Accessing and navigating WebCT
   Students observed an in-class demonstration on the campus network and received written instructions during the first two weeks of the semester.

4. Resources available on the WWW
   A WWW resource page with links to other institutions and information about PBL for students was included in the course WebCT site.

Recruiting and Training Faculty
Problem-based learning changes the role of the instructor as radically as it changes the role of the student. The activities of the faculty member shift from determining objectives and content, providing information, and assessing learning to actively facilitating group process. For the faculty member, knowledge of the subject matter involved in a case or problem is secondary in importance to the ability to effectively facilitate the group.

All faculty members who facilitated PBL groups volunteered to do so; however, only two of these facilitators had prior experience with PBL. After considering the characteristics of PBL, the characteristics and time con
EVALUATION

As the semester unfolded, the authors collected information about various aspects of the course and PBL implementation. Facilitators evaluated their training program and their experiences with students in the PBL process. Students evaluated WebCT, the entire course, and their experiences with WebCT, the entire course, and their experiences with students in the PBL process. The second training session provided facilitators with specific information about PBL cases and group process as they were conducted in Introduction to Pharmaceutical Care. Each facilitator was also provided with a manual which included detailed information for each session. A list of the contents can be found in Table II.

WebCT

WebCT-Web Course Tools-is a software product developed at and licensed from the University of British Columbia which enables an instructor to create a password-protected, web-based instructional environment. Information about WebCT is available on the World Wide Web. The University of Iowa made the product available on campus during the summer of 1997 and began training faculty to use it in the nTITLE program.

The course instructor created a WebCT site for Introduction to Pharmaceutical Care during the same semester that PBL was introduced. Because WebCT was both new to students and new on campus, use of the WebCT site was optional for students. All materials and information available at the site were also made available in other media or formats. For example, grades were available both on the WebCT site and on a list posted on a bulletin board. Nevertheless, the site was accessed by 107 of 110 students in the class approximately 3,500 times during the semester. Table III describes how various features of WebCT were implemented in Introduction to Pharmaceutical Care.

The WebCT site was never intended to become part of or to replace any part of the students’ group process during PBL sessions. However, as the course progressed, the WebCT site became an important means of communication between the students and the instructor, especially during the eight weeks of PBL, when students no longer met as a large class. In addition, it became the means for students to share their learning issue reports.

| Table III. Features of WebCT used in Introduction to Pharmaceutical Care |
|-----------------------------|-----------------------------|
| Bulletin Board Facilitated | Communication between students on a class bulletin board. |
|                           | Communication between students within a PBL discussion group or between facilitator and students in a group. |
| E-mail Made Available      | Communication of lists generated by student groups. |
| Course Pages               | Distribution of learning issue reports. |
|                            | Communication by instructor to all students in the class. |
| Student Management         | Used by the instructor and the teaching assistant to record and post grades for students. |
| Self-Test Tool             | Used by instructor to provide students with practice questions and feedback incorporated into the self-test. |
| On-Line Chat               | Used to conduct a meeting for facilitators after the second session of Case 1. |

WebCT has many features which can enrich an instructional web site. Available features which have not yet been used in Introduction to Pharmaceutical Care include the calendar, student homepage tool, searchable image archive, student presentation area, searchable and linkable glossary, timed online quizzes and tests, page annotation by students within the site, and learning goals and tips for students linked to course content web pages.

Facilitators

Facilitators evaluated their training and the usefulness of the facilitator’s guide after they had completed all PBL sessions with students. The purpose for this was to allow them to evaluate how well training helped them facilitate rather than to evaluate how well training sessions were presented or organized. As shown in Table IV, facilitators evaluated their training positively. However, the responses to Items 5, 6, and 7 are an area of concern. Although the mean values for these items indicate overall agreement with the statements, they were clearly lower than other items, and there was greater variability among responses. These findings indicate that there may be an area of the training process that inadequately prepares participants for the role of facilitator.
The cases were the right level of difficulty for my group of students.

I would recommend a similar training process to a colleague who anticipates facilitating PBL for the first time.

As a result of my experience with PBL in Introduction to Pharmaceutical Care, I am likely to use the PBL method in a course I teach or coordinate.

In response to open-ended questions in the training evaluation, nine of 15 facilitators indicated that working through the PBL process with The Case of Bessie Buick was the most valuable part of the training. Two participants named the facilitator’s guide as the most valuable component. Suggestions for additions to the training included more examples of verbal facilitation statements, strategies for encouraging quiet students, and the opportunity for everyone in the training session to practice being a facilitator.

The facilitators’ overall evaluation of the PBL process, the students, and their experience as facilitators was also very positive. The evaluation items and results can be found in Table V. The authors were encouraged to find that the facilitators’ highest ratings were for Items 12 and 13, which indicate a willingness to facilitate PBL groups in the future. Similarly, in response to Item 2, facilitators expressed comfort with the facilitator role.

Students

The overall course evaluation by students was positive, as it had been for the previous four years. The course evaluation items related to PBL and responses can be found in Table VI. The evaluation included items about students’ orientation to PBL, the PBL process, and the acceptability of the PBL experience. One hundred nine of the 110 students agreed that students in their group were comfortable with the PBL process. All but five felt that students in their group consistently took responsibility for actively participating. The overall assessment of the students’ training session, student manual and sample learning issues was positive. Nearly all the students felt they spent about the right amount of time talking during the session. There was not as much agreement about the understanding of expectations for learning issue reports, the supplementary drug information grid, or the expectations for group participation. The overall evaluation of the PBL process indicated that students would like to participate in PBL in other College courses and felt that their experience with PBL in Introduction to Pharmaceutical Care was positive.

Students also evaluated each case immediately after completing it. In general, responses after the second case were similar to those after the first case. Students felt that PBL cases helped them to learn to identify drug-therapy problems. They were also very positive about their comfort in the group and the way their groups worked together on the cases. Students’ responses indicated that they felt stimulated to learn on their own. Facilitators were viewed positively as non-interfering with discussion, respectful of students, and able to summarize ideas constructively. While the time spent preparing learning issue reports ranged from 1.59±0.93 hr. to 1.92±1.04 hr. per report over the course, more students than not felt the
amount of work preparing these reports was not too much. As seen in the course evaluation, scores for students’ ability to familiarize themselves with the assigned drug information sources were lower than expected.

Student Achievement

Students in the fall 1997 course performed similarly to students in 1996 on quizzes and a final examination which were essentially unchanged from the previous year. The mean and median course grades in 1997 were 88.7 and 89 compared to 87.0 and 88, respectively, in 1996.

Faculty Time Commitment

A concern shared by both the authors and College administrators was the impact of PBL on faculty time. Fifteen facilitators were trained prior to the start of PBL; 14 of those facilitated at least one PBL case. During the semester, the authors tabulated the amount of time facilitators spent in training sessions, in each PBL session, and in preparation for PBL on a weekly basis. Each PBL session with students was planned for a one hour and 50 minute time period once each week. The total time for all 14 faculty who were trained and facilitated groups was 218 hours. Of this time, 59.9 hours were devoted to training. Because individual faculty members may have facilitated only one case (four sessions) or substituted for one or more sessions of a second case, an average time commitment across the semester for all facilitators is difficult to evaluate. However, session length averaged 1.6 hours, and only two of 80 PBL sessions (eight sessions for each of 10 groups) exceeded two hours in length. Facilitators reported an average of 17 minutes (range: 0 to 40 minutes) of preparation time per week outside of sessions.

DISCUSSION

This report describes the implementation of PBL in an entry-level course designed to expose first-semester pharmacy students to the concepts and practice of pharmaceutical care. It also illustrates how a WebCT instructional environment can support delivery of such a course.

The authors recognize that PBL is not a new instructional method. However, it had never been tried in this college of pharmacy. In fact, most courses, with the exception of laboratories and clerkships, have been taught in a large lecture format with little active participation by students. Both authors were interested in fostering an alternative instructional environment and were willing to provide an example of how an active learning model could actually work. The authors also recognized that the success or failure of their course redesign project could affect the willingness of other faculty members to experiment in a similar manner. The authors planned the course redesign carefully, with input from as many sources of information as possible and practical in the time available.

In general, facilitators’ evaluations of their experiences with PBL indicated that participation in the redesigned course was an experience which they enjoyed. Many facilitators observed a high level of student interest in the course and found the students’ ability to adapt to PBL to exceed their expectations. Facilitators also expressed interest in facilitating PBL in the future. This reinforced the authors’ perception that faculty believed the method was not only enjoyable but achievable within the context of a single course. Fifteen facilitators were trained in 1997; seven new facilitators were trained in 1998. Faculty outside the Clinical and Administrative Pharmacy Division facilitated groups for the first time in 1998, leading to interest in how PBL could be adapted in other courses.

The authors are convinced that the positive feedback by facilitators was due in large part to the attention to preparation of the faculty prior to the initial PBL session. Faculty agreed that training sessions were time well spent and that they would recommend a similar process to others. Support for and regular contact with facilitators after training were important parts of course management during the eight weeks of PBL. The detailed facilitator’s manual, the process of distributing print materials for case ses-

Table VI. Student course evaluations, 1997 (n=110)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meanb</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. PBL was an effective format for me to learn to use drug information resources.</td>
<td>4.73</td>
<td>1.23</td>
</tr>
<tr>
<td>11. The WebCT site was helpful to me.</td>
<td>4.83</td>
<td>1.13</td>
</tr>
<tr>
<td>12. The in-class presentations about PBL on August 28th and October 9th helped me understand the PBL process.</td>
<td>4.00</td>
<td>1.10</td>
</tr>
<tr>
<td>13. The “Problem-Based Learning (PBL) Student Manual” was valuable to my participation in the PBL process.</td>
<td>4.36</td>
<td>1.19</td>
</tr>
<tr>
<td>14. The sample learning issue reports in the student manual helped me understand how to write my learning issue reports.</td>
<td>5.15</td>
<td>0.99</td>
</tr>
<tr>
<td>15. I understood how to use the “Tertiary Literature-Drug Information” grid that was provided in the student manual.</td>
<td>3.57</td>
<td>1.51</td>
</tr>
<tr>
<td>16. Students in my group were comfortable with the PBL process.</td>
<td>5.21</td>
<td>0.77</td>
</tr>
<tr>
<td>17. Students in my group consistently took responsibility for actively participating.</td>
<td>5.09</td>
<td>0.89</td>
</tr>
<tr>
<td>18. I spent about the right amount of time talking during sessions.</td>
<td>5.24</td>
<td>0.81</td>
</tr>
<tr>
<td>19. My facilitator routinely included group self-assessment the end of the session.</td>
<td>4.91</td>
<td>1.09</td>
</tr>
<tr>
<td>20. The expectations for quality of learning issue reports were clear to me.</td>
<td>4.41</td>
<td>1.31</td>
</tr>
<tr>
<td>21. The expectations for participation during group sessions were clear to me.</td>
<td>4.36</td>
<td>1.48</td>
</tr>
<tr>
<td>22. I would like to participate in PBL in other courses in the College of Pharmacy.</td>
<td>5.08</td>
<td>1.13</td>
</tr>
<tr>
<td>23. Overall, my experience with PBL in Introduction to Pharmaceutical Care was positive.</td>
<td>5.28</td>
<td>0.92</td>
</tr>
<tr>
<td>24. The cases were the right level of difficulty for me.</td>
<td>5.15</td>
<td>0.88</td>
</tr>
</tbody>
</table>

aItems 1-8,10, and 25 were unrelated to PBL and are not shown in the table.
bItems were rated according to the scale: 6=strongly agree, 5=moderately agree, 4=slightly agree, 3=slightly disagree, 2=moderately disagree, and 1=strongly disagree.
sions, and the student management tasks required of facilitators during sessions were all designed to minimize facilitators’ time commitment. In addition, facilitators were relieved of responsibility for grading except for rating each student’s participation at the end of each session.

Student responses on evaluations suggested a high level of satisfaction with their PBL experiences, and comments made by students during informal discussions supported the conclusion that they would be interested in taking others courses using this learning method. The authors believe that preparing students for the PBL process was an important contributor to overall acceptability of the method. Although the groups of 10 to 11 students were larger than the authors desired, facilitators noted few problems keeping students involved in discussions. In the areas where student ratings were lower, there was some indication that this was due to students feeling that they had received too little credit for the work they put into that aspect of the course. This was true for learning issue reports and participation in sessions. The rating system for student participation in sessions, which was designed to be simple for faculty to use, did not meet the students’ or facilitators’ needs, and it was changed in 1998 to be more helpful to both facilitators and students. Feedback from facilitators in 1998 indicated that the revised criteria were a positive change.

The instructor was pleased to observe that students not only had a positive experience with PBL, but also performed comparably to students in previous years on quizzes and tests. However, although students were repeatedly instructed to gain experience using the designated drug information references, many needed more direction in their appropriate use. This was due partly to a wide variety of learning issues which were broader in scope than drug information questions and partly to unclear direction to the facilitators about guiding students toward the references of interest. When the course was offered in Fall 1998, more direction was given to both facilitators and students during training and in their respective manuals. This change resulted in an increase in students who had an opportunity to become familiar with all eight tertiary drug information references emphasized in the course.

As the authors planned to implement PBL, they became concerned about the amount of time that facilitators would need to commit to the project. The authors trained faculty to be facilitators in two sessions which, combined, lasted about 4.5 hours. After completing this initial training, faculty members averaged 17 minutes in preparation for each two-hour session with students. This contrasts favorably with the amount of time necessary to prepare and deliver a new two hour lecture. In the future, the initial facilitator training session will need to be presented only to faculty who are being introduced to PBL for the first time or to faculty who facilitate groups infrequently. A version of the second, shorter training session will need to be presented in each course offering PBL, to standardize the approach used by faculty and to communicate information needed to help facilitators achieve course goals. An important consideration regarding time from the facilitators’ point of view relates to how faculty members document their contact time with students during PBL. This issue is unresolved at this time, and its effect on the willingness of faculty to participate in PBL in the future is unknown.

The technology-based support provided by WebCT was integral to the delivery of the course. Introduction to Pharmaceutical Care was among the first courses on the UI campus to use WebCT. Delivery of supplemental materials, communication within PBL groups, and course-wide communication would have been tremendously difficult without the use of this tool. This was evident in the sharing of learning issue reports and the opportunities for facilitators to guide students between sessions. With an average of nearly 35 accesses per student during the semester, the WebCT site was clearly utilized. Use of the WebCT site to post learning issue reports was required for all students in 1998. The authors anticipated that the use of WebCT would reduce some of the potential costs associated with providing problem-based learning. However, the true impact of WebCT on the cost of course delivery is uncertain at this time. The number of courses offered by all colleges during the fall semester which are available on the course WebCT server now exceed 160. Printing of course materials from web sites is likely to increase some costs. How this campus-wide trend will affect the cost of delivering courses like Introduction to Pharmaceutical Care is unknown.

At this time, the redesigned course has been offered to students twice. Immediate future development will be related to determining and adopting strategies that help both students and facilitators better attain instructional objectives related to the use of drug information resources. Changes in cases and PBL sessions are also likely to be attempted both to improve the PBL process and to allow students to work with a greater number of cases during the semester.

As described in this report, student achievement was examined by comparing students’ grades on quizzes and examinations in semesters with and without PBL. Future changes in the course are likely to include development of new performance assessments that better reflect what students learn during PBL and how they learn it.

CONCLUSIONS

The implementation of problem-based learning with web-based support in this course was both personally and professionally rewarding. Detailed planning for changes and an organized approach to implementing them permitted an easy transition to PBL for all involved. Both faculty and students enjoyed PBL and look forward to its future use in the curriculum. Student learning was not adversely affected. The web-based support available with WebCT facilitated provision of the course in this new format. The authors believe that both PBL and WebCT are permanent additions to the course. The knowledge and experience gained from implementing these changes will continue to be applied in other courses in the curriculum.


References


APPENDIX. AGENDAS FOR PBL GROUP SESSIONS.

Each case was conducted over a four-week period.

General Agendas

SESSION 1:
15-20 min Introductions of group members
   Brief review of PBL process before start of Case 1
35-45 min Distribution and discussion of Page 1 of the case
45 min Distribution and discussion of Page 2 of the case
5-10 min Assignment of learning issues
10 min Group assessment of the learning process

SESSION 2:
5 min Taking attendance
35-55 min Presentation of Session 1 learning issue reports
20-30 min Distribution and discussion of Page 3 of the case
20-30 min Distribution and discussion of Page 4 of the case
5-10 min Assignment of learning issues
10 min Group assessment of the learning process

SESSION 3:
5 min Taking attendance
35-55 min Presentation of learning issue reports
30-60 min Distribution of final page of case and identification of DTPs
5-10 min Assignment of problems for SOAP notes
10 min Group assessment of the learning process

SESSION 4:
5 min Taking attendance
35-55 min Presentation and discussion of SOAP notes
   Review and summary of drug-related problems
10 min Group assessment of the learning process
5-10 min Completion of evaluations

Students’ Responsibilities Throughout the Sessions

Participate in introductions.
Read case pages.
Record facts, gaps, hypotheses, and learning issues on a flip chart or blackboard and on paper for the facilitator’s use after the session.
Participate in discussion and group self-assessment.
Present learning issue reports to group members.
Present SOAP notes to group members.
Provide copies of reports and notes to the facilitator for grading.
Complete evaluations at the end of each case.

Between sessions:
Prepare reports on assigned learning issues after Sessions 1 and 2.
Write a SOAP note in response to one DTP after Session 3.
Post learning issue reports and SOAP notes on the WebCT bulletin board.

Facilitator Responsibilities Throughout the Sessions

Participate in introductions.
Take attendance.
Briefly review PBL process with students during first session of Case I.
Distribute case pages provided by teaching assistant.
Direct or choose students to act as recorder or reader.
Monitor and facilitate discussion.
Assign learning issue(s) to each student for report.
Assign a DTP to each student for SOAP note preparation.
Guide group self-assessment.
Rate each student’s participation on the attendance record.
Give copies of learning issue reports to instructor for grading.