INSTRUCTIONAL DESIGN AND ASSESSMENT

Redesign of a Large Lecture Course Into a Small-Group Learning Course

Stefanie P. Ferreri, PharmD[a] and Shanna K. O'Connor, PharmD[b]

[a]UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill
[b]University of Washington School of Pharmacy; during the study research period, Dr. O'Connor was a visiting professor at UNC Eshelman School of Pharmacy.

Objective. To describe the redesign of a large self-care course previously delivered in a traditional lecture format to a small-group case-based course.

Design. Prereadings and study guides were used to facilitate students' independent learning prior to class. Large lecture classes were replaced with smaller group-based learning classes. This change in delivery format allowed students to spend the majority of class time conducting small-group learning activities, such as case studies to promote communication, problem solving, and interpersonal skills.

Assessment. Changes in course delivery were assessed over a 2-year period by comparing students' grades and satisfaction ratings on course evaluations. A comparison of course evaluations between the class formats revealed that students were provided more opportunities to develop verbal communication skills and tackle and resolve unfamiliar problems in the revised course. The activities resulted in better overall course grades.

Conclusions. Redesigning to a small-group discussion format for a self-care course can be accomplished by increasing student accountability for acquiring factual content outside the classroom. Compared with student experiences in the previous large lecture-based class, students in the smaller-class format reported a preference for working in teams and achieved significantly better academic grades with the new course format.

Keywords: problem-based learning, pharmacy education, active learning, self-care, nonprescription drugs, flipped classroom

INTRODUCTION

Community pharmacists must be able to quickly and accurately determine whether patients are candidates for self-care therapy and refer those who are not to an appropriate healthcare provider. For patients who are self-care candidates, pharmacists must be able to select appropriate nonprescription treatment(s), counsel patients regarding treatment, and explain appropriate follow-up. To meet these requirements, student pharmacists must acquire proficiencies in communication and physical-assessment skills as well as knowledge about self-care therapeutics. These proficiencies are reflected in several of the Center for the Advancement of Pharmaceutical Education (CAPE) outcomes.[1] At the UNC Eshelman School of Pharmacy at the University of North Carolina at Chapel Hill, self-care therapeutic topics are taught in a single stand-alone course.

Corresponding Author: Stefanie P. Ferreri, PharmD, UNC Eshelman School of Pharmacy, Campus Box 7574, Beard Hall 115B, Chapel Hill, NC 27599-7574. Tel: 919-843-9765. Fax: 919-843-3861. E-mail: stefanie_ferreri@unc.edu

In the previous 3 years of self-care and community introductory pharmacy practice experience (IPPE) course evaluations, students have indicated a lack of confidence in their ability to assess patients quickly and thoroughly in their community pharmacy practice experiences. Reports from preceptors and firsthand accounts also confirmed this uncertainty and inability to assess patients in practice.[2] This perceived deficiency led the course director to believe that the CAPE outcomes could be better addressed by redesigning the course.

Evaluating the effectiveness of the course was consistent with the school of pharmacy's Educational Renaissance,[3] which challenges the traditional instructor-centered model of higher education. Several studies have shown the usefulness of shifting material delivery from an instructor-centered model to a student-learning−centered model, emphasizing the utility of active learning over traditional lecture, especially for developing non−content-related skills (eg, communication, critical thinking skills). These studies illustrate the benefits derived from integrating active-learning components into large-group lectures. Active-learning components documented in the literature

include use of an audience-response system, small-group discussions, and team-based learning.[4-13] Although many of these studies involve undergraduate nonpharmacy courses, the theories related to teaching and learning presented therein were used in the redesign of this self-care course.

The redesigned course used a flipped classroom design. It shifted to a student learning-centered method, moving the foundational content to self-directed learning, thus using class time to develop noncontent skills, such as communication, problem-solving, and interpersonal skills. The hypothesis was that the student-learning—centered model would prepare student pharmacists to perform well on metrics designed to represent the interactions and assessments necessary to treat self-care patients in community pharmacy.

DESIGN

The UNC Eshelman School of Pharmacy's Educational Renaissance prompted the redesign of this course, which was supported by school administrators and faculty members.[3] At the time of the redesign, most courses at the school were delivered in a lecture format. The self-care course is a required, 3-credit course that meets twice weekly for 80 minutes in the spring semester of the second year of the doctor of pharmacy (PharmD) program. Class is delivered synchronously to 2 campuses with an approximate enrollment of 150 students, 10 of whom are at a satellite campus. The course is taught primarily by 1 faculty member with 10 years of experience in self-care therapeutics. During the course redesign, a co-instructor with minimal experience assisted with the course, which introduces concepts pertinent to self-care in community practice and is a prerequisite to the community IPPE. Students complete their community IPPE during the summer immediately after completing the patient self-care course.

Upon successful completion of the course, students were expected to be able to appropriately gather patient data and make an accurate assessment regarding self-care; these 2 skills are necessary for IPPE completion. During the redesign, the ability-based outcomes for the course did not change, but there was a shift in expectations for students to demonstrate the outcomes, which were adopted from CAPE (Table 1).

The emphasis of the objectives of the redesigned course was on application, analysis, and evaluation rather than knowledge of nonprescription products. There was an intentional shift to a content-delivery method that was student-centered in order to move students from memorizing information to gathering patient information and applying that information to patient self-care scenarios.

Table 1. Ability-Based Outcomes for Redesigned Patient Self-Care Course

Gather and organize essential patient information
Identify and prioritize medication-related problems
Formulate evidence-based, patient-specific medication treatment plans
Assist the patient with implementation of treatment plans
Monitor/evaluate patient response to and modify pharmacotherapy
Document patient care interventions
Access relevant print or electronic information and data
Gather, summarize, and organize information from lay, technical, scientific and clinical publications, and patient records
Communicate health and drug-related information to patients, professional colleagues, other health professionals, and community groups in an understandable and useful fashion, including patient-specific drug information, medication therapy and disease-management information, disease detection and prevention information, and poison control and treatment information
Gather, organize, and summarize information
Communicate effectively through verbal expression
Communicate effectively in writing or via multimedia
Demonstrate professional competence, critical thinking, and self-directed learning skills
Demonstrate professional accountability, responsibility, initiative, and leadership

To achieve the course outcomes, small-group learning was integrated into class time, a change that significantly altered the course from its previous structure. The rationale for the flipped classroom was twofold. First, because the model of healthcare delivery relies on a team-based approach, students needed to work as part of a team prior to their practice experiences. Second, the new course structure allowed students to practice patient-assessment scenarios in the safe environment of a classroom. Having students practice patient-assessment skills in every class should ensure their confidence and ability to make quick and accurate assessments of actual self-care patients when in practice.

Prior to the redesign, class was 85% lecture-based, involving few patient examples or cases. Faculty members incorporated an audience-response system to assess student understanding of the material, but questions typically focused on knowledge- rather than application-based material. Table 2 shows the breakdown of class time before and after the course redesign. Although the time students were asked to spend preparing for in-class activities did not change with the redesign, they were reminded more frequently of the prereading expectation

Table 2. Comparison of Patient Self-Care Course Before and After Course Redesign from Lecture-Based to Active-Learning Course

Activity	Before Course Redesign	After Course Redesign
Preparation	Faculty: 3 hours per week (roughly 1.5 hours per class period) TA: 1 hour per week (30 minutes per class period)	Faculty: 4 hours per week (roughly 2 hours per class period) TA: 1.5 hours per week (45 minutes per class period)
Prereadings (student)	Requested	Expected and reinforced
Breakdown of Class Time	2-hour session (once weekly): 10 min: Background material (topic 1) 10 min: Exclusions to self-care (topic 1) 10 min: Non-Pharmacologic interventions (topic 1) 20 min: Pharmacologic interventions (topic 1) 10 min: Background material (topic 2) 10 min: Exclusions to self-care (topic 2) 10 min: Non-Pharmacologic interventions (topic 2) 20 min: Pharmacologic interventions (topic 2) 20 min: Lecture-driven cases with use of clickers (topics 1 and 2) 1-hour session (once weekly): 10 min: Background material 10 min: Exclusions to self-care 10 min: Non-Pharmacologic interventions 20 min: Pharmacologic interventions 20 min: Lecture-driven cases with use of clickers	80-min session (twice weekly): 5 min: Review prereading (student questions, clicker questions) 10 min: Group assessment of case 1 (focus on exclusions to self-care) 10 min: Class discussion, case 1 10 min: Minilecture (nonpharmacologic, pharmacologic options review, clicker questions to review prereading, focus on appropriateness of therapy, minicases) 10 min: Group assessment of case 2 (emphasis on nonpharmacologic treatment, SGL sometimes submitted here based on topic and time) 5 min: Class discussion, case 2 (emphasis of key points related to exclusions to self-care, clicker questions to highlight nuances) 10 min: Minilecture (emphasis on appropriateness of therapy, focus on differentiation between pharmacologic options, clicker questions to review material from prereading) 10 min: Group assessment of case 3 and SGL submission (practice of SCHOLAR-MAC, emphasis on integration of material and decision-making) 10 min: Review, case 3 (emphasis on thought process for choosing intervention; resolution of discrepancies from case) 5 min: Emphasize key points
Sample SGL question, Cough and cold	N/A	Assess the patient using SCHOLAR-MAC. Determine appropriate course of action, which may include referral, nonpharmacologic treatment, pharmacologic therapy, or a combination of these. Give a rationale for your decision.
Assessment of in-class learning	Knowledge-based clicker question followed by discussion	Application-based clicker question followed by discussion; SGL (submitted through electronic survey platform, graded by teaching assistant, written feedback provided on course Web site)

Abbreviations: TA=teaching assistant; SGL=small-group learning; SCHOLAR-MAC = symptoms; characteristics of symptoms; history of symptoms; onset; location; aggravating factors; remitting factors; medications; allergies; conditions.

to encourage all group members to be adequately prepared for discussion. Student groups worked on communicating with and triaging patients as well as generating treatment plans and appropriate recommendations for follow-up.

An outline of how the content was delivered in a sample class period is shown in Table 2. Individual classes varied slightly based on topic, but exclusions to self-care, nonpharmacologic and pharmacologic treatment, and follow-up were covered as appropriate. The topics covered in the course before and after the redesign are listed in Table 3. The course was divided into 4 modules, each of which concluded with an examination. After the course redesign, 4 topics (home test kits, diabetes supplies, tobacco cessation, and sunburn) were removed from the modules based on level of importance to the average community pharmacist and the fact that they were adequately addressed in other curriculum courses. The removal of these topics allowed for the creation of a fourth module, during which group presentations occurred. Background material regarding statistics, prevalence of disease state, and basic pathophysiology was left out of the class instruction and moved to required reading for the class. Broad concepts were discussed and then applied to case scenarios, with medication-specific details discussed in groups and then reviewed as a class to highlight important points. Depending on the topic, 3 to 4 cases were discussed per class period, with each case highlighting a different aspect of the disease topic for the day.

Prereadings consisted of pertinent literature and chapters from the assigned course textbook. Students were asked to complete these readings prior to class; questions about the readings were addressed at the start of each class. Prereadings included material such as the exclusions for self-care in a particular therapeutic area, appropriateness of self-care in patient populations, and nonpharmacological treatment options. Readings were typically between 15 and 35 pages per class. Discussion of prereading material during class centered on highlighting key points, defining clinical pearls, and applying information to patient-care scenarios.

Students on the main and satellite campuses were divided into groups based on experience working in a community pharmacy. Student groups consisted of a member from each of the following domains: no community experience, less than 6 months' experience, 6 to 24 months' experience, and greater than 24 months' experience. Students were randomly grouped by the instructor and were assigned seats that were designed to facilitate working in their groups throughout the semester. Student groups at the satellite campus were engaged in small-group

Table 3. Topics Covered in Course Before and After the Redesign From Lecture-Based to Active-Learning Course

Module 1
Course overview, legal and regulatory issues
Introduction to special populations and counseling
Dry skin and atopic dermatitis
Contact dermatitis
Scaly dermatoses
Minor wound care
Tinea infections
Minor foot disorders
Insect bites and pediculosis
Special populations - dermatological disorders
Sunburn[a]
Module 2
Cough
Common cold and allergy
Analgesics
Special populations - cough/cold/allergy/fever
Vitamins and minerals
Herbals and dietary supplements
Women's health issues
Home test kits[a]
Module 3
Heartburn
Nausea/vomiting/diarrhea
Constipation and hemorrhoids
Special populations - gastrointestinal
Oral hygiene
Ophthalmic and otic disorders
Tobacco cessation[a]
Diabetes supplies[a]
Module 4[b]
Group cases[b]

[a] Only in the course before the redesign
[b] Only in the course after the redesign

work as well as the large-group discussions by means of a live 2-way video.

In their groups, students worked on case-based activities every class period throughout the semester. The small-group activities initially focused on learning the acronym SCHOLAR-MAC (Symptoms; Characteristics of symptoms; History of symptoms; Onset; Location; Aggravating factors; Remitting factors; Medications; Allergies; Conditions),[14] a pneumonic device that allows students to quickly and accurately assess a patient for a self-care condition. One example of these activities is a role-play scenario in which 1 student played the patient and another played the pharmacist. Prior to the role play, patient information was provided to the mock patient but not to the student playing the pharmacist. The group worked through the SCHOLAR-MAC process to assess the case scenario and then worked together to find a solution for

the patient's complaint. As students mastered the mechanics of patient assessment, the small-group learning exercises grew more complex, were restricted in time, and used different formats to promote student engagement. At the end of the semester, groups were randomly selected to gather information from hypothetical patient cases. Each group deliberated and generated a recommendation, which was submitted for a grade. Toward the end of the semester, the time allotted to group work was reduced to 5 minutes per case to more accurately reflect real-world scenarios. The intent of the changes was to create a gradual increase in the intensity and constraints of interactions, beginning with small-group role-plays and culminating with group assessment of patients.

Thirty percent of the course grade was based on small-group activities. Although pharmacists practicing in the community setting typically respond to patient inquiries of this nature independently, group work was used as a learning strategy to help promote the development of communication skills and teamwork, as well as to allow for percolation of ideas. During each class period, groups submitted a learning activity that was graded. Each group member received the same grade for this activity, and these exercises were the predominant mechanism for assessing student groups. The activity was a self-care case that required group members to work together to gather essential information and determine an appropriate recommendation. The groups submitted their free-response answer using an online survey platform, and responses were downloaded by the course teaching assistant for grading.

At the end of the semester, groups practiced and presented the skills they had learned in front of the class. This presentation was the culmination of the semester in that it combined basic information-gathering with advanced concepts, such as patient assessment and evaluation. The group presentation assessment was the penultimate assignment prior to the final examination. A student group was randomly selected to analyze a patient case and topics for these assessments were provided to students ahead of time. They were given 8 minutes to work together as a team to assess the patient, formulate a plan, and discuss it with the patient. The remainder of the class worked in their groups to formulate a group recommendation, which they submitted for a group grade.

EVALUATION AND ASSESSMENT

The expected outcome of this course was to produce student pharmacists with the ability to perform well on metrics designed to represent the interactions and assessments necessary to treat self-care patients. Student reactions to the course were obtained from the end-of-semester course evaluations. Overall response rates from the course evaluations were 86% from the year prior to the course redesign and 85% and 98% from the first 2 years of the course redesign. The comments addressed aspects of the course related to structure, content, and assessments that needed to be strengthened or improved. Five independent reviewers categorized the comments as positive, neutral, or negative. Prior to the course redesign, student comments from evaluations were 40% positive, 27% neutral, and 33% negative; comments regarding the redesigned course were 31% positive, 19% neutral, and 50% negative ($p=0.016$)

Consistently positive themes prior to the redesign were relevance and applicability of the course as well as appropriate placement of the course in preparing for community IPPE. Consistently negative themes before the redesign were "pickiness" of test questions, grading of assessments, and the amount of prereading assignments. Consistently positive themes after the redesign included emphasis on group work, confidence with patient assessment, placement in the curriculum, and relevance to practice. Consistently negative themes after the redesign were inconsistent grading, unclear examination questions, and general course policies regarding examination reviews and release of instructor slide sets and examinations. Students suggested shortening prereading assignments and improving group work assignments by making the integration of SCHOLAR-MAC into patient cases more seamless. Twenty-nine percent of all students' comments during the first year of the redesign were that grading of small-group learning sessions was too harsh. Based on this feedback, the grading was simplified for the second year.

A separate section of the course evaluations asked students to indicate which skills they had learned or improved on as a result of the course. This was a standardized questionnaire developed by the Office of Assessment that was consistent across all courses in the curriculum. Students who took the redesigned course indicated an improvement in verbal communication skills, ability to tackle and resolve unfamiliar problems, ability to work as part of a team, and the understanding of and ability to work effectively with individuals from diverse cultures (Table 4). Written communication skills decreased across all 3 years, which was expected because of the increased emphasis on verbal communication and removal of a required writing project. Student perceptions of the impact the class had on their ability to plan and manage their own learning and professional development were unchanged.

The penultimate group-presentation assessment demonstrated that all groups were able to effectively gather

Table 4. Responses to the Questionnaire Items Beginning With "This course provided opportunities for me to develop…"

Item	Before Course Redesign (n=126)	After Course Redesign, Year 1 (n=129)	After Course Redesign, Year 2 (n=134)	P[a]
	Responses, %			
Verbal communication skills	39.7	84.5	91.6	<0.001
Written communication skills	71.4	55.8	35.6	<0.001
My ability to plan and manage my own learning and professional development	75.4	56.5	74.8	1.0
My ability to tackle and resolve unfamiliar problems	65.1	72.1	87.7	<0.001
My ability to work as part of a team	27.8	93.0	95.4	<0.001
My understanding of and ability to work effectively with culturally diverse individuals	27.0	38.8	70.0	<0.001

[a] Before the course redesign vs after the redesign, year 2.

information from hypothetical patient cases. During this presentation, groups were independently evaluated by 2 faculty members using a faculty-developed rubric; discrepancies in evaluations were resolved immediately after each class. The rubric emphasized the groups' ability to obtain all pertinent information from the patient in a logical manner. The bulk of the presentation assessments focused on groups' teamwork and communication skills as well as recommendation appropriateness. After all presentations were conducted, the rubrics were scanned and sent to the presenting teams as a means of providing constructive feedback. This demonstration of ability was considered important to the course redesign in that it showed that practical questioning skills learned in the small-group activities directly translated into groups being able to assess self-care patients. However, the effectiveness of students' questioning skills varied across groups based on team cohesiveness. The grade breakdown for this exercise from the first year of the redesign was 35%, A; 35%, B; and 30 %, C. The second year of the course redesign showed an improvement in these grades: 50%, A; 38%, B; and 12% C. The same grading rubric and scale were used both years. Evaluators noted 2 trends: groups were consistently able to gather information and make appropriate recommendations but lost points on recommendations for follow up.

Seventy percent of the final grade was based on individual assessment, the bulk of which was conducted by means of incorporating patient cases into the examinations. The course included 3 examinations and 1 cumulative final examination. All were comprised of 50% multiple-choice questions and 50% case-based short-answer questions. Both multiple-choice and short-answer questions required assessment of patient scenarios and application of material. As part of the written final examination, students were required to evaluate a hypothetical

patient scenario, in which faculty members role-played at the beginning of the examination and students individually critiqued the scenarios. Students were required to determine the effectiveness of information-gathering for each patient case and provide written comments regarding areas for improvement. This exercise incorporated knowledge of patient assessment with critical thinking and evaluative skills.

The final examination also reflected that students clearly understood the pharmacist's approach to self-care patients. During the faculty role-play, students determined areas for improvement when presented with self-care patient scenarios. All students received at least 90% of the points for this assessment question; there was no trend related to student performance. As there was no precedent for the evaluation of students' ability to assess a patient, the change in knowledge could not be assessed. The evaluation of learning reflects that students performed well in both the traditional and revised courses, with academic grades showing a significant improvement in the course redesign (Table 5). Although the metrics for grading were not identical from year to year, overall individual student performance in class was not negatively impacted.

Upon completion of this course, student pharmacists immediately transitioned to the practice arena to complete their community IPPEs. Based on yearly practice experience grades, students generally tended to perform well on these experiences, with all students passing. During their IPPEs, student pharmacists were required to complete a minimum of 2 self-care recommendations, for which they received a grade from their preceptor. Independent questioning of 8 IPPE preceptors suggested that students who had experienced the new course format were more confident with patient assessment, but these observations were not verifiable with objective metrics. Formal

Table 5. Students' Final Grades in a Patient Self-Care Course, %

Final Grade	Before Course Redesign (n=146)[a]	After Course Redesign, Year 1 (n=152)[b]	After Course Redesign, Year 2 (n=151)[c]
A	21	32	52
B	66	63	44
C	12	5	4
F	1	0	0

[a] $p=0.033$ for grade distribution before course redesign vs after course redesign, year 1.
[b] $p<0.002$ for grade distribution after course redesign, year 1 vs after course redesign, year 2.
[c] $p<0.001$ for grade distribution before course redesign vs after course redesign, year 2.

community IPPE preceptor evaluations and student grades did not show a difference from 1 year to the next, possibly because it is difficult to detect a difference when the scores from all years are similar (data not shown).

The curriculum committee's review of the redesigned course was positive. Specific areas highlighted included use of active learning and increased student accountability for preparation prior to class. As a way to improve the course, the committee suggested focusing on clarity of examination questions, particularly with respect to level of detailed knowledge required.

Faculty member perspectives were obtained through reflective sessions throughout the semester and independent self-evaluations conducted at the end of the semester. Throughout this course, participating faculty members were asked to transform material previously presented in lecture format to a format more conducive to higher-level learning. Faculty members noted that in the redesigned course, individual lectures did not take longer to prepare, but that more time was required for planning. This structure allowed more time for application-based work in the class, as reflected in Table 6. Prior to the redesign, the course instructor spent approximately 3 hours per week preparing for class, and teaching assistants spent approximately 1 hour per week grading. During the redesign phase, the course instructor spent approximately 6 hours per week preparing, and teaching assistants spent approximately 3 hours per week grading. During the second year, the course redesign demanded less faculty time; the course instructor spent approximately 4 hours per week preparing for class, and teaching assistants spent approximately 1.5 hours per week grading.

DISCUSSION

This study further demonstrates the benefits derived from integrating active-learning components into large-group lecture courses. A case-based, student learning-centered model was expected to produce students with high ability to perform on metrics designed to replicate interactions with self-care patients typically found in community pharmacy practice. The assessment of this shift in learning was focused on performance in patient-care scenarios rather than on examinations or in actual practice scenarios. Although the latter might have been most beneficial, this measurement was not feasible within the confines of a single semester course but might be a subject for future studies. After the redesign of this class, student pharmacists reported that the course developed their verbal communication skills and their ability to effectively work as a team member; both of which are essential skills for future pharmacists. Students reported a high level of comfort with SCHOLAR-MAC in the course evaluations, and stakeholder comments reflected improved performance of students on practice experiences and in third-year courses.

Student comments reflect that they enjoyed active engagement in the classroom, which is encouraging for expansion of this revision to other institutions. Faculty members may be hesitant to redesign their course based on the perception that more time would be required, but

Table 6. Organization and Structure of a Patient Self-Care Course, %

Instructional Component	Before Course Redesign	After Course Redesign, Year 1	After Course Redesign, Year 2
Lecture	50	30	20
Demonstration of concepts/techniques	5	5	5
Role-playing exercises	5	15	15
Self-directed/self-study assignments	15	15	20
Case-/problem-based activities	20	30	40
Writing assignments	5	5	0

this experience showed that the time commitment was increased for the first year of the course redesign but then was roughly the same as the previous course after the first year of implementation. The amount of time spent in preparation of course materials increased, but it decreased for lecture time. Having administrative support, such as a teaching assistant, reduced the time required for preparation and shifted the burden of updating grades. Faculty members considering using a more active-learning approach in their large-enrollment classes might consider these points in their revisions.

Although course grades improved significantly and the learning outcomes improved after the course redesign, course evaluations included significantly more negative comments. Faculty members will need to keep this in mind when considering this type of redesign. This finding is consistent with literature demonstrating that student ratings of a course are not a significant predictor of final course grades.[15-17] Colleges or schools that move to student learning-centered models should expect course evaluations to be lower. This could potentially impact promotion and tenure if the academic institution relies on positive evaluations for academic success of its faculty members.

Some limitations to this study include the inability to follow up with students after graduation. Ideally, assessment of change in practice and confidence upon graduation would be compared for students before and after the course redesign, but unfortunately, this type of assessment was not feasible. Although most self-care topics are covered in this single class, patient-assessment techniques are emphasized in other courses throughout the curriculum; thus, changes to these courses may have affected student performance. The use of different cohorts of students may have impacted the results of this study, as differences between classes cannot be accounted for. Although the same graders were used across all years to avoid individual differences in grading, it is possible that variance was introduced. Furthermore, although the same rubrics were used when possible, changes in assignments across the years also may have introduced variance. The improvement in course grades also may be attributable to greater accountability for course preparation rather than active learning. Finally, the data from stakeholders are anecdotal rather than objective and could be subject to bias.

Moving forward, the course director plans to reflect yearly on what can be done to keep the course innovative. Minor adjustments will be made to improve the learning experience of the students based on feedback received from course evaluations. For example, after the first year, students and faculty members felt that there was too much grading involved after each class to determine the correct answers for the small-group learning activities. The course was changed to place less emphasis on grades for these activities. The focus shifted to the desired outcome of communication and triage for year 2, and this will be continued for year 3. Further, upon the conclusion of year 2, faculty members decided that low-stake quizzes at the start of class should be added to ensure student preparation. An emphasis on follow-up to self-care recommendations will be placed earlier in the semester to help address student performance on the end-of-semester group presentations. Students also suggested that practice group presentations in front of the entire class should be incorporated throughout the entire semester prior to the high-stakes presentations at the end of the semester; these will be incorporated in lieu of 1 of the daily cases. The ability to make slight adjustments to the course allows for improved response to student concerns as well as a continual evolution of the course.

Areas of future study include student performance on community pharmacy APPEs as well as proficiency and confidence in practice. Another study opportunity lies in the examination of student performance and interest among students and faculty at satellite campuses. Finally, given that team cohesiveness is important to group success, a study examining different team-building exercises within the course might be helpful.

SUMMARY

Redesigning a large lecture into an active-learning class requires advanced planning. A small-group discussion format is possible in a large-enrollment patient self-care course by increasing student accountability for acquiring factual content outside the classroom. Compared with student experiences in the previous large lecture-based class, students in the smaller-class format reported a preference for working in teams and achieved significantly better academic grades with the new course format. Both learners and faculty members had a rewarding experience using active learning.

ACKNOWLEDGEMENTS

REFERENCES

1. American Association of Colleges of Pharmacy. CAPE outcomes. http://www.aacp.org/resources/education/Documents/CAPE2004.pdf. Accessed June 19, 2012.
2. Ferreri S. Prepare to answer self-care questions. *Pharm Today OTC Suppl.* 2011;Feb (S1)1.
3. Blouin RA, Joyner PU, Pollack GM. Preparing for a renaissance in pharmacy education: the need, opportunity, and capacity for change. *Am J Pharm Educ.* 2008;72(2):Article 42.

4. Meltzer DE. The relationship between mathematics preparation and conceptual learning gains in physics: a possible 'hidden variable' in diagnostic pretest scores. *Am J Phys.* 2002;70(12):1259-1268.

5. Michael J. Where's the evidence that active learning works? *Adv Physiol Educ.* 2006;30(4):159-167.

6. Deslauriers L, Schelew E, Wieman C. Improved learning in a large-enrollment physics class. *Science.* 2011;332(6031):862-864.

7. Moravec M, Williams A, Aguilar-Roca N, O'Dowd DK. Learn before lecture: a strategy that improves learning outcomes in a large introductory biology class. *CBE Life Sci Educ.* 2010;9(4):473-481.

8. Hake RR. Interactive-engagement versus traditional methods: a six-thousand-student survey of mechanics test data for introductory physics courses. *Am J Physics.* 1998;66(1):64-74.

9. Smith MK, Trujullo C, Su TT. The benefits of using clickers in small-enrollment seminar-style biology courses. *CBE Life Sci Educ.* 2011;10(1):14-17.

10. Fitzpatrick KA, Finn KE, Campisi J. Effect of personal response systems on student perception and academic performance in courses in a health sciences curriculum. *Adv Physiol Educ.* 2011;35(3):280-289.

11. Smith MK, Wood WB, Krauter K, Knight JK. Combining peer discussion with instructor explanation increases student learning from in-class concept questions. *CBE Life Sci Educ.* 2011;10(1):55-63.

12. Sibbald D. Elective self-care course emphasizing critical reasoning principles. *Am J Pharm Educ.* 2011;75(9):Article 82.

13. Gleason BL, Peeters MJ, Resman-targoff BH, et al. An active-learning strategies primer for achieving ability-based educational outcomes. *Am J Pharm Educ.* 2011;75(9):Article 186.

14. Buring SM, Kirby J, Conrad WF. A structured approach for teaching students to counsel self-care patients. *Am J Pharm Educ.* 2007;71(1):Article 8.

15. Bembenutty H. Teaching effectiveness, course evaluation and academic performance. *J Adv Acad.* 2009;20(2):326-355.

16. Marsh HW, Roche LA. Effects of grading leniency and low workload on students' evaluations of teaching: popular myth, bias, validity or innocent bystanders? *J Educ Psyc.* 2000;92(1):202-228.

17. Aleamoni LM. Student rating myths versus research facts from 1924-1998. *J Pers Eval Educ.* 1999;13(2):153-166.