

TEACHERS' TOPICS

An Advanced Pharmacy Practice Experience in Academia

Lynne M. Sylvia, PharmD

Massachusetts College of Pharmacy and Health Sciences-Boston*

Submitted January 5, 2006; accepted February 11, 2006; published October 15, 2006.

Objectives. To create an advanced pharmacy practice experience (APPE) that would encourage students to consider a career in academia.

Design. A 6-week, 6-credit elective APPE was created that offered students the opportunity to observe and participate in activities consistent with a full-time faculty appointment.

Assessment. A 9-question survey instrument was administered to 27 students who completed the APPE between 2000 and 2004 to determine the impact of the APPE on the student's career choice. Sixteen (59%) of the 27 students returned the completed survey instrument. Ten of the 16 respondents noted that the APPE had influenced their pursuit of a position with a teaching component.

Conclusion. Offering APPEs in academia may encourage students to incorporate teaching and scholarship into their career plans.

Keywords: faculty, recruitment, teaching, advanced pharmacy practice experience, academia

INTRODUCTION

In response to the current pharmacy faculty shortage, the 2004-2005 AACP Academic Affairs Committee was charged with identifying strategies for attracting qualified candidates to careers in academia. In July 2005, the Committee released its report entitled, "Ensuring Individual Success in an Academic Career."¹ As identified by the Committee in this report, an existing strategy for the promotion of academic careers is the offering of academic internships or advanced pharmacy practice experiences (APPE) by colleges and schools of pharmacy to senior-level pharmacy students. Monthly teaching seminars and certificate programs for postgraduate fellows, graduate students, and pharmacy residents were also noted for their potential impact in promoting careers in pharmacy education.

Comparable to the current challenges in pharmacy education, dental educators are also facing a faculty shortage. In 1999, a taskforce of the American Dental Education Association predicted that the number of dental graduates considering an academic career (estimated as 0.5% to 1.3% of graduates from 1980 through 1999) would not meet the demands of faculty replacement.² The taskforce subsequently recommended the mentoring and recruitment of future faculty members through the

development of academic dentistry/apprentice teaching experiences targeted at fourth-year dental students.² Bibb and Lefever³ describe their 2 year-experience with the offering of an apprenticeship in academic dentistry at the UCLA School of Dentistry. In their elective course, aptly named "Hands-On Experience for Future Dental Educators," fourth-year dental students were introduced to concepts of learning theory, test question writing, and the development of course evaluation instruments. The "student teachers" were also required to develop their own "microcourse" which was delivered to first-year dental students during their orientation program. When asked to evaluate their teaching experience, 20 of the 21 student teachers expressed the intent to include teaching in their career plans.³ All of the student teachers agreed that participation in the elective course influenced their decision to pursue a role in academic dentistry.

APPEs in teaching have been described in the pharmacy literature.^{4,5} Structured teaching seminars and scholarship of teaching/learning certificate programs designed specifically for pharmacy residents have also been described.^{6,7} These programs foster the participant's appreciation for and interest in an academic pharmacy career. In 1995, Selander and Bjornson⁴ provided a detailed description of an elective clerkship in teaching and a summary of 2 students' experiences with the 5-week clerkship. In 2001, Hammer and Paulsen⁵ described a 6-week elective APPE that provided students with experience in both the teaching and service aspects of an academic position. The 5 students who completed this elective APPE noted how valuable the learning

Corresponding Author: Lynne M. Sylvia. Address: Tufts-New England Medical Center, Department of Pharmacy, 750 Washington Street #420, Boston MA 02111. Tel: 617-636-9211. E-mail: lsylvia1@tufts-nemc.org

*Affiliation at time of writing. Current affiliation: Department of Pharmacy, Tufts-New England Medical Center.

experience was to their professional development. Other APPEs or clerkships in teaching have been described in the form of abstracts presented at national meetings.⁸⁻¹² As recommended by the 2004-2005 AACP Academic Affairs Committee, descriptions of these model programs (eg, academic internships, APPEs, certificate programs) need to be compiled and disseminated, and the programs need to be evaluated longitudinally to determine whether they have an impact on a candidate's career choice.¹

At the Massachusetts College of Pharmacy and Health Sciences in Boston (MCPHS-Boston), a 2-tiered approach is used to foster and promote academic careers to young, qualified professionals. In 2001, the Residents Teaching Seminar was established and offered to all local pharmacy practice residents. This annually offered, monthly seminar program has been previously described in this *Journal*.⁷ To date, 79 pharmacy residents have successfully completed the program; 12 of the participants who completed the program currently hold full-time faculty positions and 36 have adjunct faculty appointments. In 2000, an elective APPE in academia was established at the college and offered to sixth-year PharmD students interested in exploring the role of the faculty member. The 6-week APPE offers students the opportunity to become actively engaged in teaching, service, and scholarship under the guidance and preceptorship of a pharmacy practice faculty member. As of November 2005, 43 students have completed the elective APPE. This paper describes the APPE in detail and provides a longitudinal assessment of the impact of this experience on the promotion of a career in academia.

DESIGN

At MCPHS-Boston, students complete 6 APPEs, each 6 weeks in duration, for a total of 36 weeks of advanced experiential education. Students are required to complete 2 institutional pharmacy practice APPEs (ie, 6 weeks of inpatient medicine and 6 weeks of hospital pharmacy practice), 2 ambulatory care APPEs (ie, 6 weeks in community pharmacy practice and 6 weeks in another ambulatory care setting) and 2 elective APPEs (ie, 1 patient care rotation and 1 non-patient care rotation, or 2 patient care rotations). The 6-credit elective in academia was 6 weeks in duration and did not involve patient care. The APPE students were involved in didactic, on campus teaching, service, and scholarship. The students had 1 primary preceptor, a campus-based pharmacy practice faculty member.

During the 6-week rotation, the APPE student assumed the responsibilities of a student teacher in 1 of 2 required courses in the PharmD program. *Disease State Management (DSM) I* and *II* are consecutive 6-semester

hour, required courses coordinated by the APPE preceptor and offered in the fifth year of the PharmD curriculum. APPE students enrolled in the academic rotation in the fall semester were engaged in student teaching for 6 of the 16 weeks of instruction in *DSMI*, whereas APPE students enrolled in the spring semester participated in student teaching for 6 weeks in *DSMII*. A total of 4 rotation periods were offered by the APPE preceptor for this elective rotation: two 6-week rotations in the fall semester and two 6-week rotations in the spring semester. No more than 3 APPE students were enrolled per rotation period. Students were eligible for the elective APPE if they had earned a B or better in the fifth-year courses, *DSMI* and *DSMII*.

At least 60% of the APPE students' activities related to teaching. The students were required to attend all lectures in *DSM*, the course in which they served as a student teacher. Approximately 200 students were enrolled in this course. *DSM*, a team-taught course, met 3 times a week for 100 minutes per session with a 1-hour recitation period at the end of each week. Attendance of students at the recitation was voluntary; weekly attendance ranged from 50 to 125 students. The design and delivery of the weekly recitation period was the responsibility of the APPE student(s). The recitations were conducted as active-learning sessions, consistent with the format and delivery of *DSMI* and *DSMII*. The APPE students were responsible for designing each weekly recitation to reinforce the lecture objectives of at least 2 of the week's lectures. Prior to delivery of each recitation, all instructional materials (eg, patient cases, teaching points, and interactive exercises) designed by the student teachers were reviewed by the APPE preceptor and, when appropriate, by the individual *DSM* instructors. During the rotation, the APPE students also provided one-on-one and small group tutoring to students enrolled in *DSM*, answered questions, and responded to "muddy points" posted by students on the *BlackBoard* component of the course, and served as a student teacher for a small group section of the course, *Therapeutics Seminar*. In the latter course, the APPE students assisted in the facilitation of case discussions related to the lecture topics presented in *DSM*. During each weekly 3-hour session of *Therapeutics Seminar*, each APPE student assisted a faculty member/facilitator in the discussion of these cases with a small group of 15 students.

The primary objective of the elective APPE in academia was to offer the student the opportunity to both observe and participate in activities consistent with a full-time faculty appointment. The specific objectives of the APPE, as outlined in the syllabus, were as follows:

1. to describe the steps to the systematic design of instruction;
2. to design instruction using a variety of instructional strategies;
3. to define and differentiate the domains of learning;
4. to access, evaluate and apply the academic literature to academic pharmacy;
5. to develop criteria-based examination questions related to specific topics in disease state management;
6. to compare and contrast a variety of educational methods (eg, large classroom instruction, small group instruction, discussion based teaching);
7. to formally present and discuss a controversial topic in academic pharmacy;
8. to design an evaluation instrument which effectively measures one's teaching performance;
9. to engage in service as demonstrated through participation in committee activities;
10. to engage in scholarship as demonstrated through manuscript peer review activities, formal oral and/or poster presentations and publications;
11. to develop a professional teaching portfolio.

The competencies were measured via a number of structured activities performed by the student throughout the rotation. At the start of the rotation, the APPE students received a 185-page teaching packet which consisted of the APPE syllabus, the APPE schedule, selected readings, lecture and examination preparation guidelines for use by instructors in *DSMI* and *DSMII*, and a number of interactive exercises that the students were required to complete during the rotation. The packet was organized according to units of instruction. The 6 units of instruction completed during the APPE were: introduction to a career in academia, learning styles, designing effective instruction with a focus on active learning, examination writing, the teaching portfolio, and the affective domain of learning. The focus questions and selected readings for each unit of instruction and the unit-specific activities that the APPE students were required to complete are listed in Appendix 1. Discussion of each unit and review of the related activities occurred during the student's two 2-hour weekly meetings with the preceptor. The units on learning styles and the design of effective instruction were completed during the first week of the rotation so that the APPE students were able to design instruction for the weekly recitations and effectively engage in teaching. The units on examination writing and the teaching portfolio were

discussed during week 2 of the rotation. Typically, discussion of all units was completed by the third week of the APPE. For the remaining 3 weeks of the rotation, the APPE students were asked to design their own meeting agendas for each of the two 2-hour weekly meetings with the preceptor. Agenda items often included the interim review of teaching portfolios, the critique of sample examination questions to be posted on *BlackBoard*, the review of recitation materials, and the discussion of other pertinent academic topics that arose during the APPE.

In addition to responsibilities in teaching, all attempts were made to engage the APPE students in service to the college. The APPE students were asked to select a committee to observe during the 6 week-rotation and some students were given the opportunity to actively contribute to the committee's activities. During the past 5 years of the offering of this APPE, students have served on the SOP Professional Affairs Committee, the Task Force on Communications (a subcommittee of the SOP Curriculum Committee), and on a Department of Pharmacy Practice Task Force on Faculty Assessment. APPE students have contributed to these committees by conducting literature searches and providing literature reviews of selected topics, performing course mapping of the professional curriculum relative to the assessment of oral and written communication skills, and critiquing and redesigning faculty evaluation instruments. The APPE students also served on the Fifth Year Student Focus Group, a committee that offers the opportunity for dialogue between fifth-year PharmD student representatives and the course coordinators of the professional courses offered in the fifth year of the PharmD curriculum.

The APPE students were also engaged in a number of scholarship activities during the rotation. Each student needed to identify an academic topic of interest and research this topic using a variety of educational databases and literature sources. The APPE students formally presented their topics and their findings to a core group of faculty members and fellow students. This required activity offered the students exposure to the academic literature (eg, the ERIC database, *American Journal of Pharmaceutical Education*, *Academic Medicine*) and allowed them the opportunity to identify and evaluate the body of evidence specific to instructional design and assessment. The APPE students were encouraged to select a topic that related to their activities and/or responsibilities in the rotation. For example, the APPE students routinely aided in the facilitation of *Therapeutics Seminar*, a discussion-based course that involved collaborative teaching with small groups. As such, the APPE student may have questioned the method by which students were assigned to small groups. Based on this observation, the

student may have generated a number of research questions worthy of investigation such as, “What is the optimal method for allocation of students to small groups?” “Is it best to allow students to choose their own group composition or is randomized allocation preferred?” “What are the pros and cons associated with allowing students to determine their own group’s composition?” Research questions recently investigated by APPE students are presented in Table 1. Depending on the research question, some students also developed questionnaires or other instruments used to survey the student body or the faculty. In addition to evaluating the academic literature on the research question, these students also gained experience in designing reliable survey instruments, and in organizing and evaluating original research data. During the rotation, the students were also exposed to the manuscript peer-review process by confidentially reviewing a blinded manuscript, preparing “mock” constructive comments directed to the author(s), and reviewing the actual peer reviewers’ comments on the manuscript. Other opportunities for scholarship may have included collaboration on the development of a brief review article for submission to a journal for publication, the development of a teaching case with an answer key and references for use in the *Therapeutics Seminar* (consistent with the format used in published casebooks), and the review of book or educational program proposals. All attempts were made to expose the student teachers to the variety of scholarship activities in which the APPE preceptor was involved.

The APPE students were provided with a number of resource materials for use throughout the rotation. In addition to the teaching packet distributed on day 1 of the rotation, the students had access to former students’ portfolios and to a resource binder that contained copies of sample examination questions, recitation materials, and presentation handouts developed by former APPE students. The students also had access to a collection of articles on a variety of academic topics that had been compiled by the preceptor.

EVALUATION AND ASSESSMENT

The APPE students were evaluated using both formative and summative assessment methods. During each weekly meeting with the preceptor, each student received constructive feedback on his/her assignments and his/her delivery of the recitation sessions. Feedback was provided using the CRC approach where C = commendation and R = recommendation.⁷ The student also received feedback on his/her weekly performance in *Therapeutics Seminar* by his/her individual facilitator using the CRC approach. During the third week of the rotation, a midpoint evaluation was performed which focused on all aspects of the student’s performance in the rotation. The midpoint evaluation provided an interim assessment of all aspects of the student’s final assessment. The student’s performance on weekly assignments (eg, design of sample examination questions, development of competency-based objectives for each recitation, delivery and content of weekly recitation sessions) comprised 40% of the final

Table 1. Academic Pharmacy Topics for Formal Presentation

Student evaluations: improving the quantity and quality of student responses
Faculty role modeling: inspiring the students of today to become the teachers of tomorrow
Analyzing the academic honor code: are we on target?
Student leadership – do you consider yourself a leader? A survey of the student body
Can the clinical problem solving process be introduced earlier in the PharmD curriculum? A proposal for curriculum revision at MCPHS
Situated learning – what it is and would it be an effective learning strategy at MCPHS?
Problem based learning – what are the essential components?
Design of an introductory practice experience in community pharmacy practice: description of a pilot program
Design of a APPE in managed care practice: description of a pilot program
Collaborative learning – how do you ensure individual accountability in small groups?
Collaborative learning – what is the optimal size and allocation method of small groups?
Designing instruction based on generation-related learning styles
Incivilities in pharmacy education – how are they best prevented?
Development of a student professionalism plan at MCPHS
Implementing active learning strategies in the professional curriculum at MCPHS
The design of OSCEs for implementation in the first and third professional years at MCPHS
What motivates students to learn? A survey of students at MCPHS

grade. Scholarship (eg, formal presentation of an academic topic, development of a case study with answer key), the teaching portfolio and participation accounted for 25%, 20%, and 15%, respectively, of the final grade in the APPE. Participation was based on the student's preparedness for discussions, time management as related to assignments, and professionalism as displayed in interactions with students and faculty members. Each aspect of the final assessment, with the exception of individualized scholarship activities, was evaluated using a standardized evaluation instrument. The portfolio was evaluated using a rubric that addressed the following items: organization and goals; statement of teaching philosophy; reflections; supportive evidence in teaching, service and scholarship; and overall presentation of the portfolio.

The APPE student also received feedback from the students enrolled in *DSMI* and *DSMII*. The evaluation instrument was designed by the APPE student and approved by the preceptor. In this regard, the APPE students were given the opportunity to take ownership not only in their teaching methods but also in the evaluation of their teaching techniques. A sample evaluation instrument developed by an APPE student is provided in Table 3. The results of the evaluation, as completed by the fifth-year students who routinely attended *DSMI* recitation, are also provided in Table 3.

The APPE student had the opportunity to evaluate the rotation using a standardized assessment form developed and distributed by the Division of Experiential Education at MCPHS-Boston. Completion of this evaluation by APPE students was voluntary; completion of the evaluation is mandatory as of the 2005-2006 academic year. Eighteen of the 43 students (42%) who completed the APPE in teaching between September 2000 and November 2005 submitted an evaluation of the rotation. The results of the evaluation are provided in Table 2.

In an attempt to identify whether the APPE in teaching had any impact on the APPE students' selection of career paths, a 9-question survey instrument was distributed in September 2005 to 27 of 29 students who had completed the APPE between the years 2000 and 2004. The survey instrument consisted of 4 demographic questions (eg, year of graduation, post-graduate training, current position, teaching appointment) and 5 questions regarding the perceived impact of the APPE on the graduate's selection of a professional position. The former APPE students were asked to submit the completed survey instrument via e-mail to their former APPE preceptor by October 1, 2005. The 27 students were chosen based on the availability of a current e-mail address as accessed via the Office of Alumni Relations or via other contacts at the College. Students who completed the rotation in aca-

Table 2. Student Evaluations of APPE in Teaching (N=18)

Evaluative Item	Mean Score*
The expectations and activities of the rotation were clearly described.	5
The preceptor encouraged questions and comments.	4.8
The preceptor seemed genuinely interested in student's progress.	4.8
Rotation challenged my academic and experiential skills.	4.8
Rotation improved my ability to function in a similar setting.	5
The preceptor provided periodic feedback throughout the rotation.	5
The site provided a positive learning environment.	4.8
I would recommend this rotation to other students.	5

*1 = strongly disagree; 2 = disagree; 3 = mixed feelings; 4 = agree; 5 = strongly agree

ademic year 2004-2005 were not surveyed because they had just graduated. Of the 27 students surveyed via e-mail, 16 (59%) returned the completed survey instrument. E-mail messages sent to 7 of the students were returned as "undeliverable" and further attempts to contact these individuals via regular mail were not successful. Four students who were successfully contacted via e-mail did not return the survey instrument. The results of the survey are provided in Appendix 2.

DISCUSSION

The purpose of this paper was to describe an APPE in academic pharmacy and assess whether the APPE influenced students' career paths. The results of a survey of 16 former APPE students support that the APPE had some influence on the students' selection of professional positions. Ten of the 16 respondents to the survey noted that the APPE influenced their pursuit of a position with a teaching component. Those 10 respondents all held a faculty position at the time of the survey, either as a full-time appointment (n=3) or as an adjunct professor (n=7). Seventy-five percent of the respondents (n=12) were applying the teaching skills acquired in the APPE to the education of students, patients, or health care providers on a daily basis. An additional 19% of respondents (n=3) reported the application of these skills on a weekly basis. These results offer some preliminary evidence to support the impact of an academic APPE on a student's decision to incorporate teaching into their career plan.

In addition to cultivating an interest in teaching as a career, the academic APPE offered students the ability

Table 3. Evaluation of APPE Students by Fifth-Year Pharmacy Students Attending Recitation (N = 75)

Evaluation Item	Agree or Strongly Agree, %
The student teacher showed enthusiasm and concern for student learning (n = 65)	87
The student teacher was approachable (n = 63)	84
The student teacher encouraged me to think critically and to draw <i>my own</i> conclusions (n = 60)	80
The recitations run by the student teachers were constructive, useful, and focused on relevant course content (n = 58)	77
The student teachers were respectful and appreciated the different learning styles of students (n = 64)	85

to refine their oral presentation skills, work collaboratively with others on committees and team-based projects, develop time management skills, and practice their ability to teach others using a variety of educational strategies and techniques. The ability to communicate and collaborate with a diverse group of individuals (prescribers, policy makers, members of the community and other health care providers) is an educational outcome statement provided by the Center for the Advancement of Pharmaceutical Education (CAPE).¹³ Although not explicitly stated in the CAPE document, the ability to teach is paramount to one's ability to provide pharmaceutical care. As noted by a number of the respondents to the survey, the skills acquired in the APPE have been routinely applied to the teaching of patients, caregivers, medical students, pharmacy residents, and pharmacy students. The ability to identify the learning needs of a target audience, whether a group of students or patients, and then target one's teaching style to best meet the educational needs of that audience, were fundamental skills acquired in the APPE.

The most important aspect of the APPE, as noted by all students who have completed the rotation, is the "hands on" experience with the teaching of both large and small groups of students. In the role of student teacher, the APPE students were responsible for designing their own instruction, delivering this instruction on a weekly basis to a large group of students, and contributing to discussion-based teaching of a small group of students. The ability to actively participate in the educational process and to be responsible for an aspect of student learning was a rewarding and often humbling experience for the student teachers. Through active participation, rather than observation, the student teacher

was able to "test the water" of teaching and take ownership in the educational process. The direct involvement of the APPE student in the classroom also allowed for effective role modeling and mentoring of the fifth-year PharmD students. Each year, students who chose the elective APPE often did so based on their observations of the previous APPE students. The positive, professional role modeling of the APPE students was empowering to the underclassmen, cultivating an attitude of "If he can do it, so can I."

The 2004-2005 Report of the Academic Affairs Committee suggests that member institutions "increase the number of advanced pharmacy practice experiences that emphasize academic and research development"¹ as a method of attracting students to a career in academia. When designing an APPE in academia, it is important to determine the optimal faculty-student teacher ratio. For the past 5 years, either 2 or 3 APPE students were assigned to the preceptor for each rotation period. Considering this faculty-student teacher ratio, it was necessary to design the APPE such that the student teachers could engage in group-based projects and also work independently on individualized assignments. Each student teacher was also individually assigned to a facilitator of *Therapeutics Seminar* to allow for a one-on-one mentoring relationship. In addition, time was allocated by the APPE preceptor for individualized coaching, encouragement and guidance of each student teacher. As stated in the report of the Committee, "it is important that the academic assistant be adequately prepared and made clear of his/her responsibilities, and that a faculty member (ie, typically the course coordinator) work closely with the student to make sure that the assistantship is a meaningful educational experience."¹ At MCPHS-Boston, as in many other colleges and schools of pharmacy, courses in teaching or instructional design are not required components of the PharmD curriculum. The elective APPE needed to be designed to provide both instruction on learning theory and related pedagogy/andragogy, and the application of such theory to pharmacy education. The development of preparatory units of instruction on core areas in education and the compilation of a sourcebook on selected readings were necessary in preparing the student for a meaningful experience in academia.

The time required of the APPE preceptor to execute the APPE and coach the student teacher is another important consideration. During the first week of each APPE, delivery of the preparatory units of instruction on effective teaching and learning styles have required 2 half-day sessions with the APPE students. At least 10 to

15 hours per week were spent by the APPE preceptor overseeing the activities of the APPE students (eg, reviewing instructional materials for recitations, reviewing sample examination questions to be posted on *Black-Board*, meeting with individual student teachers about selected student issues, reviewing scholarship and committee work). An additional 5 hours per week were spent ensuring that there were effective lines of communication between the student teachers and all other parties involved in the core course in DSM (ie, individual lecturers, students enrolled in the course, and module coordinators). Having the time to coach the student teachers and ensure that their activities were complimentary to those of the course instructors was essential to the success of the program. Most important, the availability of time for frank, open discussions between the preceptor and the student teacher was a must. In order for the student teacher to gain a realistic view of a faculty position, he/she needed to “walk in the shoes” of a faculty member, sharing in the rewards of the position and in the daily challenges.

Since the initiation of this academic APPE, additional APPEs in teaching have been established by faculty members at MCPHS. Students now have the additional option of choosing an elective academic APPE in association with the Assistant Dean for Experiential Education or one offered by a practice faculty member who coordinates the institutional pharmacy practice laboratory. The potential now exists for collaboration between the APPE preceptors and the development of a uniform preparatory “minicourse” for all students engaged in an academic APPE.

SUMMARY

A 6-week elective APPE in academia was developed to offer pharmacy students an opportunity to observe and participate in the 3 primary activities of a faculty position: teaching, scholarship, and service. A longitudinal assessment of students who completed the APPE between 2000 and 2004 supports that the experience had an impact on career planning and career choice.

REFERENCES

1. Ensuring Individual Success in an Academic Career: Report of the 2004-05 Academic Affairs Committee. Available at: http://www.aacp.org/Docs/AACPFunctions/Governance/6820_AcademicAffairsFinalReport.doc?DocTypeID=4&TrackID=&VID=1&CID=633&DID=452. Last accessed: January 3, 2006.
2. American Association of Dental Schools. Future of dental school faculty: Report of the president's task force. Washington, DC: American Association of Dental Schools; 1999.
3. Bibb CA, Lefever KH. Mentoring future dental educators through an apprentice teaching experience. *J Dental Educ.* 2002;66:703-9.
4. Selander LK, Bjornson DC. Description of an elective PharmD teaching clerkship. *Am J Pharm Educ.* 1995;59:273-8.
5. Hammer DP, Paulsen SM. An innovative clerkship in pharmacy education. *Am J Pharm Educ.* 2001;65:284-93.
6. Romanelli F, Smith KS, Brandt BF. Teaching residents how to teach: a scholarship of teaching and learning certificate program (STLC) for pharmacy residents. *Am J Pharm Educ.* 2005;69:Article 20.
7. Sylvia LM. Mentoring prospective pharmacy practice faculty: a seminar series on teaching for pharmacy residents. *Am J Pharm Educ.* 2004;68:Article 38.
8. Sanoski C, Boyce E, Takiya L, et al. Description and analysis of an elective teaching rotation [abstract]. In: Podium and Poster Abstracts. 103rd Annual Meeting, July 14-17, 2002, Kansas City, Missouri. *Am J Pharm Educ.* 2002;66:103S.
9. Fuhrman LC, Arant M, Brown K, et al. Development and implementation of an academic pharmacy practice experience rotation [abstract]. In: 102nd Annual Meeting, July 8-11, 2001, Toronto, Canada. *Am J Pharm Educ.* 2001;65:92S.
10. Bongiorno RA, Dodds ES, Lanjuin SM, et al. Implementation of a teaching rotation for Doctor of Pharmacy students. ASHP Midyear Clinical Meeting. 1998;33:55D (Abstract; IPA accession # 35-13356).
11. Briceland LL, Hobson EH. Comprehensive pharmacy education clerkship experience: preparing students for academic pharmacy practice [abstract]. In Podium and Poster Abstracts. 103rd Annual Meeting, July 14-17, 2002, Kansas City, Missouri. *Am J Pharm Educ.* 2002;66:102S.
12. Hobson EH, Briceland LL. Integrated pharmacy education PharmD clerkship: preparing for academic pharmacy practice [abstract]. In: Podium and Poster Abstracts 100th Annual Meeting: July 3-7, 1999, Boston, Mass. *Am J Pharm Educ.* 1999;63:76S.
13. Center for the Advancement of Pharmaceutical Education, American Association of Colleges of Pharmacy. Available at: http://www.aacp.org/docs/MainNavigation/Resources/6075_CAPE2004.pdf. Accessed on January 3, 2006.

Appendix 1. Units of Instruction and Required Activities

Units	Discussion Points	Recommended Readings	Activities
Introduction to academia	<p>What are the three primary responsibilities of a faculty member?</p> <p>What constitutes scholarship?</p> <p>How do I access the academic pharmacy literature?</p> <p>Is evidence-based literature on teaching available?</p>	<p>Robinson ET. The pharmacist as educator: Implications for Practice and Education. <i>Am J Pharm Educ</i> 2004;68(3):article 72</p> <p>Popovich NG. On being a faculty member. <i>J Pharmacy Teaching</i> 2002: 10(1): 81-94</p> <p>Raehl C. Changes in pharmacy practice faculty 1995-2001: Implications for junior faculty development. <i>Pharmacotherapy</i> 2002;22(4): 445-462</p> <p>Heiberger MM, Vick JM. Learning the Lingo. <i>Chronicle of Higher Education: Career Network</i>, April 22, 2002</p> <p>Hammer DA, Sauer KA, Fielding D et al. White paper on best evidence pharmacy education (BEPE). <i>Am J Pharm Educ</i> 2004;68(1): article 24</p>	<p>Identify a committee to observe; provide reflections of this experience on this committee in portfolio</p> <p>Identify a research question related to teaching or academic practice; Access and evaluate the academic literature (eg, ERIC database, CINAHL) when researching this topic; Present the topic to selected faculty and fellow students; Provide a reflection of this activity in portfolio</p>
Learning styles	<p>How do people learn?</p> <p>What is a learning style? Do learning styles differ in adult learners versus children?</p> <p>Does a student have one style of learning?</p> <p>Should a learning style be accommodated by an educator? If so, to what degree?</p> <p>How do I, as an educator, learn? How is my teaching style influenced by the way that I learn?</p>	<p>http://www2.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/ilsweb.html (Soloman BA, Felder RM. Index of Learning Styles Questionnaire) – 1/4/06</p> <p>http://www.vark-learn.com/english/page.asp?p=questionnaire (The VARK Questionnaire) -1/4/06</p> <p>Austin Z. Development and validation of the pharmacists' inventory of learning styles (PILS). <i>Am J Pharm Educ</i> 2004;68(2): article 37</p>	<p>Provide a reflection on your learning style and how it may have influenced your teaching style during the APPE</p> <p>Apply the principles of learning styles to the design of educational sessions (one-on-one tutorials, recitations, etc.)</p>
Designing effective instruction with a focus on active learning	<p>What constitutes effective teaching?</p> <p>What are the key steps to the systematic design of instruction?</p> <p>What are the key elements to a measurable competency-based objective?</p> <p>What is Blooms taxonomy and how does it relate to teaching and assessment?</p>	<p>Lubaway WC. Evaluating teaching using the best practices model. <i>Am J Pharm Educ</i> 2003;67(3): article 87</p> <p>Dick W, Carey L. Introduction to Instructional Design. In: Dick W, Carey L (ed). <i>The systematic design of instruction</i>. NY, NY: Longman Books; 1996:2-12</p>	<p>Design instruction for presentation at weekly one-hour recitation periods. Design these sessions to reinforce the objectives provided in the lecturer's handouts. Use at least 1 active learning strategy in each session</p>

(continued on next page)

Appendix 1. (continued) Units of Instruction and Required Activities

Units	Discussion Points	Recommended Readings	Activities
	How many learning objectives can be effectively addressed in a one or two hour educational session?	Blooms taxonomy at http://www.coun.uvic.ca/learn (1/4/06)	Design one-on-one tutoring sessions for selected students. Customize the sessions based on the student's learning styles and educational needs
	What are the advantages and disadvantages to lecturing?	Schultheis NM. Writing cognitive educational objectives and multiple choice test questions. <i>Am J Health-Syst Pharm</i> 1998;55:2397-401	Design a 20 minute formalized presentation on an academic pharmacy issue. Identify two to three learning objectives for the session
	What is student-centered learning? What strategies are available to facilitate an active learning environment in a large classroom?	Jaquee D. Teaching small groups. <i>BMJ</i> 2003;326:492-494 Weimer M. Learner-centered teaching: five key changes to practice. San Francisco CA: Jossey-Bass; 2002	Assist in the facilitation of discussion-based teaching in a small group setting. Provide a reflection on this experience in the portfolio
Examination writing and assessment	How do you measure both inductive and deductive learning/reasoning?	Schultheis NM. Writing cognitive educational objectives and multiple choice test questions. <i>Am J Health-Syst Pharm</i> 1998;55:2397-401	Write 4-5 examination questions based on the learning objectives of at least 5 lectures that you attend during the semester; post these sample questions on <i>BlackBoard</i> for student review
	What are the steps involved in writing effective multiple choice examination questions? Essay questions?	Kidd RS, Latif DA. Student evaluations: are they valid measures of course effectiveness? <i>Am J Pharm Educ</i> 2004;68(3): article 61 Examples of teacher designed/scored feedback questionnaires at http://www.psu.edu/celt/open-ended.html (10/8/03) Johnson JT, Stowe CD, Savidge MA et al. Enhancing the quantity and quality of student comments on teaching assessment tools. <i>J Pharmacy Teaching</i> 2003;11(1): 41-56	Grade quizzes, where appropriate, using a structured answer key Review the item analysis of a graded examination; analyze the findings; aid in the preparation of an answer key Critique examination questions with a focus on the lecture objectives and the expected level of cognition Design an assessment form to be completed by students in assessing the effectiveness of your instruction in the recitation sessions and the small group sessions
Affective domain of teaching	What is the affective domain of teaching?	Krathwohl's taxonomy of the affective domain. http://classweb.gmu.edu/ndabbagh/Resources/Resources2/krathstax.htm (10/12/05)	Provide reflections of your interactions with students in your portfolio with attention to the development of their professional attitudes and behaviors

(continued on next page)

Appendix 1. (continued) Units of Instruction and Required Activities

Units	Discussion Points	Recommended Readings	Activities
	How does the affective domain relate to the professional socialization of pharmacy students?	Pharmacy professionalism toolkit for students and faculty. Version 1.0; 2004. www.aacp.org (10/12/05) Berger BA. Incivility. <i>Am J Pharm Educ</i> 2000;64:445-450 Hammer DP, Berger BA, Beardsley RS et al. Student professionalism. <i>Am J Pharm Educ</i> 2003;67(3): article 96	Observe the behaviors of students and faculty in the large classroom and small group settings; Discuss incivilities that you have witnessed and the manner in which they were addressed by faculty and students
The teaching portfolio	What is a teaching portfolio? What is its purpose and its contents? What is a statement of teaching philosophy?	Developing a teaching portfolio: faculty and TA development. http://ftad.osu.edu/portfolio/index.html . August 5, 2005 Recommended portfolio contents at http://www.cte.iastate.edu/campusprograms/portfolio.html Designing a teaching portfolio at http://www.psu.edu/celt/portfolio.html (10/8/03)	Develop a curriculum vitae as the first item in your teaching portfolio Develop a statement of teaching philosophy Maintain a teaching portfolio during the APPE with reflections on its contents Discuss the different teaching philosophies/teaching styles conveyed in the following papers: Kalman Harris M. We are smarter than our students. <i>The Chronicle Review in The Chronicle of Higher Education</i> , October 11, 2002 Specter M. Look at me: a teaching primer. <i>The Chronicle Review in The Chronicle of Higher Education</i> . September 27, 2002 Temes P. The naked professor. <i>The Chronicle Review in The Chronicle of Higher Education</i> . August 9, 2002

Appendix 2. Longitudinal assessment of APPE students in teaching (N = 16)

Demographic Variables	No. (%)
1. Year of Graduation:	
2002	9 (56)
2003	4 (25)
2004	3 (19)
2. Post-graduate training	
Completion of a residency/fellowship	11 (69)
3. Current position	
Clinical specialist in hospital setting	7 (44)
Full time faculty member, college/school of pharmacy	3 (19)
Staff pharmacist (community pharmacy)	2 (13)
Consultant pharmacist	2 (13)
Professional pharmacy association management	1 (6)
Pharmaceutical Industry (Manager, Clinical Affairs)	1 (6)
4. Do you hold a faculty appointment (either full-time or adjunct)?	
Yes	10 (63)
Full-time appointment	3 (30)
Adjunct appointment	7 (70)
Application of skills obtained in the APPE to current practice setting	
5. Within the past year, I have:	
Precepted pharmacy students at my site of practice	13 (81)
Assisted in the precepting of students at my site	10 (63)
Provided a lecture at a college/school of pharmacy	5 (31)
Facilitated a small group seminar at a college of pharmacy	8 (50)
Provided a lecture for a formalized nursing program	6 (38)
Provided a lecture for a formalized medical program	5 (31)
Precepted pharmacy residents at my site of practice	7 (44)
Other teaching experience (precept a pharmacy fellow)	1 (6)
6. How often do you use the skills acquired in the teaching rotation?	
Daily	12 (75)
Weekly (at least once a week)	3 (19)
Monthly (at least once a month)	0 (0)
Rarely; I don't have the opportunity to routinely apply these skills in my practice	1 (6)
7. In your current position, how much time do you spend educating other professionals?	
1 2 3 4 5 6 7 8 9 10	
None of my time	All of my time
Mean	7.12
Median	7