

Evaluating Pharmacy Student Performance on Acute Care Advanced Pharmacy Practice Experiences (APPEs)

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ABSTRACT. This paper describes using graded assignments linked to outcome statements for the evaluation of students on an internal medicine acute care Advanced Pharmacy Practice Experience (APPE). Assessable activities were linked to the College's outcome expectations. Students were graded on patient presentations, provision of drug information, documentation of communications, and general participation. An A minus was the most commonly awarded grade. Greater than 90% of the students felt that realistic objectives were met, that the assignments reflected the material, that the evaluation was constructive and that the course and instructor were effective. Students were assigned a well-balanced range of grades using this tool. Students' evaluations of the APPE were positive and implied their satisfaction with the grading of the APPE. With modification, this tool could be used by other preceptors or directors of experiential learning. doi:10.1300/J060v14n02_06 [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com> © 2007 by The Haworth Press. All rights reserved.]

KEYWORDS. Advanced Pharmacy Practice Experiences, evaluation, assessment, grading, outcome expectations

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Journal of Pharmacy Teaching, Vol. 14(2) 2007
Available online at <http://jpt.haworthpress.com>
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doi:10.1300/J060v14n02_06

INTRODUCTION

Teaching advanced pharmacy practice experience (APPE) students, formerly known as clerkship students, can be an intimidating prospect for many pharmacists. Besides wondering how much time it will take and what they can teach the students, pharmacists may not know how to evaluate the students at the end of the APPE. Preceptors should work with college of pharmacy experiential learning directors to create specific tools and guidelines to help assign grades to APPE students.

To create a tool or guideline, one must first decide on what the student will be evaluated. Should effort be the primary determinant of a student's grade? While good effort is necessary, effort alone does not translate into success. Likewise, basic knowledge does not infer ability to perform. Bloom's taxonomy¹ categorizes cognitive skills as knowledge, comprehension, application, analysis, synthesis, and evaluation. In acute care APPEs, preceptors should evaluate students on their ability to synthesize and evaluate information in order to optimize the pharmaceutical care of their patients. For example, a student needs to know more than a list of beta-blockers or the side effects of those drugs. Students on an acute care APPE need to be able to recommend appropriate beta blocker therapy for a wide variety of patients taking into account all the pertinent variables and then be able to monitor the therapy and make appropriate changes to the patient's therapy based on the monitoring parameters.

Well-developed and clearly defined expectations of the APPE student are also required. These expectations have traditionally been objectives that are specific to individual APPEs. However, recently there has been a growing interest in using the college of pharmacy's programmatic outcomes statements or competencies as the expectations for APPEs.²⁻⁴ Standard 12 of the Accreditation Council for Pharmacy Education (ACPE) Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree states that student learning outcome expectations for the curriculum must be developed.⁵ The American Association of Colleges of Pharmacy Center for the Advancement of Pharmaceutical Education (CAPE) developed general educational outcomes in 2004, but these are not outcome expectations specific to the curriculum of any college of pharmacy.⁶ Since the APPEs are capstone courses, it is logical to use the final curricular outcome expectations as the expectations of the APPEs.

After expectations are developed, one should create a method of evaluating the student's achievement of those expectations. Different

methods are currently used at colleges of pharmacy across the country. Arbitrary assignment of grades, written, verbal and practical examinations, observations ratings and graded assignments are all used as sole methods or in combination to evaluate APPE students.

While an arbitrary assignment of a grade at the end of an APPE is still probably done, it is discouraged. This type of grading cannot be defended if appealed; it is affected by the preceptor's personal feelings about the student; and it does not necessarily reflect student achievement of the outcome expectations. Formal techniques for evaluating student performance may include examinations, observations ratings, and grading of assignments.

Examinations all share the disadvantages of evaluating the whole APPE on one day and of inducing test anxiety. If the student is ill, sleep-deprived, or suffering from test anxiety on the day of the examination, they may under-perform on the examination and not receive the grade that was earned throughout the entire rotation. Three basic types of examinations, written, verbal, and objective structured clinical examination (OSCE), have been commonly described in the literature.⁷⁻¹⁰

Written exams are not as subjective as other types of evaluations, but they have their disadvantages as well. While not impossible, it is difficult to assess synthesis and evaluation of data with a written exam. In addition, written exams can not evaluate certain outcomes such as professionalism, verbal communication skills, utilization of technology, and literature evaluation. In one study on the effectiveness of written testing for APPE students, the examinations did not consistently reflect overall student performance.⁷

Verbal examinations may assess synthesis and evaluation of data better than written exams since the tester can ask the student additional questions based on their initial response. They also evaluate verbal communication skills. However, verbal exams are still not adequate to evaluate all the outcomes, and grading of verbal exams is often subjective. At least one study has demonstrated the poor reliability of verbal examinations.⁹

Practical examinations using stations with standardized patients or standardized participants are also used to evaluate APPE students. Often times referred to as an Objective Structured Clinical Examination (OSCE), these exercises are extremely time consuming for students and even more so for faculty.¹⁰ These exams have the advantage of assessing the student's ability to synthesize and evaluate data, and, if structured correctly, OSCEs can evaluate most of the outcome expectations.

Subjectivity remains an issue with OSCE type exams, and variability in grading has been observed.⁸⁻¹⁰

Students can also be assessed by rating observations. A Likert scale is often used for this type of evaluation. By rating observations, a preceptor is able to evaluate the student's ability to synthesize and evaluate data. This technique also evaluates all the pertinent outcomes for the APPE. The disadvantages for rating observations are subjectivity and evaluating the entire APPE on one day. One technique aimed at reducing the subjectivity is to attach a description, or a rubric, to each level on the Likert scale. Using rubrics, the Virginia Commonwealth University School of Pharmacy found that 82% of students and 96% of preceptors were satisfied with the grading process.³

Finally, preceptors can grade assignments given to the students in order to determine the student's grade. With the right assignments, including several patient cases, an evaluation of data synthesis and evaluation is possible. All the APPE outcomes can be evaluated with carefully chosen assignments as well. Graded assignments do not escape the problem of subjectivity, as grading patient cases, in-services, etc is not totally objective. However, the subjective grading is spread throughout the entire APPE, so that one bad day does not result in a poor grade for the student. An APPE in Miami, Florida integrated long-term care, acute care, and ambulatory care and used graded assignments to evaluate the students.¹¹ It was well received, and 11 of 11 students (100%) said they would recommend the APPE.

This paper describes using graded assignments linked to outcome statements for the evaluation of students on an internal medicine acute care APPE. It is hoped that this document will provide preceptors and directors of experiential learning another option as they design an evaluation tool for acute care APPE students.

METHODS

The University of Utah College of Pharmacy created outcome expectations for the graduates of the Doctor of Pharmacy (PharmD) program based on the 1997 ACPE standards.¹² Three adult medicine preceptors that are part of the college's core faculty determined, by consensus, which outcome statements were addressed by the acute care APPEs in the curriculum. These outcomes were adopted *verbatim* as the objectives for the herein described acute care APPE in Internal Medicine. The objectives are listed in the appendix.

The procedures and evaluation tool described in this manuscript pertain only to the particular APPE of one faculty preceptor, the author of this manuscript. Since fall 2004, the APPE has been 6 weeks in length and was 4 weeks long prior to that. Students and preceptor round with an internal medicine team caring for 5 to 20 admitted patients per day at the University of Utah Hospital. The students must intensely monitor and follow 2 to 3 new patients per week, in addition to any patients they are already following from previous days or weeks. The patients are chosen by the students within guidelines outlined to them by the preceptor. Assessable activities that reflect student performance of the objectives were developed by the preceptor of the APPE. On the first day of the APPE, the objectives of the APPE are shared with the students and the graded activities are mapped to the objectives. The extent to which each activity will influence the student's final grade is further explained.

Sixty percent of the student's grade is based on graded case presentations and follow-up presentations. The students verbally present patient cases 2 or 3 times per week. To prepare their cases, they are expected to use information from the written and electronic charts, the patient or patient's family, the physicians, the nurses and any other appropriate health care providers. The students are also expected to research the drugs and diseases relevant to their patient using primary and tertiary literature. Each patient presentation is given a score from 0 to 100. Each case presentation starts out with a perfect score and the preceptor deducts points for each missed or suboptimal monitoring parameter or recommendation. Case presentations during the first few weeks of the APPE are graded more leniently than presentations during the latter part of the APPE. This allows for the student to learn from their mistakes without being overly penalized for mistakes they eventually correct. The students follow presented patients as long as they are on the medical service. The students are given a weekly score (0-100), starting with week #2, as to how well they followed their patients after the initial presentation. These case presentations and follow-up presentations evaluate the student's ability to perform objectives 1 through 8.

To evaluate performance toward objectives 8 and 9, the students are asked to provide drug information to the medical team, nurses, or patients. When asked a question, the student often gives a verbal response which is then documented by the student. That written documentation and copies of any written responses provided by the student are given to the preceptor. At least one written response to a drug information question is required during the APPE. The written response should include

the question asked, brief background information, data to support the answer, and the conclusion or answer. It should include 3 to 6 references and should be less than one type-written page long. The quality and quantity of the students' verbal and written responses are evaluated and assigned a score from 0 to 100. This drug information score, representing both verbal and written responses, accounts for 20% of the student's final score.

Students are required to maintain a record of all verbal or written communications they give to the medical team, other health care providers, the patient or the patient's caretakers, that potentially improve any patient's care. The quantity and quality of these records are evaluated and assigned a score (0-100) that represents 10% of the student's final score. This activity evaluates student's achievement of objectives 9 and 10.

Finally, students are given a participation score from 0 to 100 based on how well they involve themselves in rounds and topic discussions. The students are expected to have prepared in advance for announced discussions on any particular topic. Each student is asked to lead the discussion on one topic each week. The participation score accounts for 10% of their final score. While points for professional behavior are not awarded, the right to deduct points for unprofessional conduct is reserved. The graded activities are summarized in Table 1.

A spreadsheet with the pre-assigned point allocations for each of the activities was constructed. Throughout the APPE, the spreadsheet is updated with numerical scores for the assigned activities. Notes justifying the score assigned for each activity are attached. At appropriate intervals throughout the APPE, the student is provided with the most up-to-date version of the spreadsheet with scores on the assigned activities completed. Why each score was assigned is explained to the students. Written feedback on: the student's strengths; recommendations on how they can improve; and expectations for the duration of the APPE is also provided. Students are given a signed and dated copy of the spreadsheet with the written comments. Students with poor scores are required to sign and date the document as well, and a copy is kept by the preceptor.

At the end of the APPE, the spreadsheet calculates the student's final percentage score. The student is provided with the final version of the spreadsheet with all the scores for the assigned activities and their final percentage score. An explanation is provided to the student on how the score was assigned. Written feedback on the student's strengths and recommendations for improvement is provided. Finally, the student is

TABLE 1 Summary of Graded Activities

Graded Activity	Objectives assessed	Method of Scoring	% of final grade
Patient presentations and continued patient monitoring	1-8	Each presentation is scored on a scale from 0 - 100 as is each week's monitoring.	60%
Drug information responses, written and verbal	8,9	At least one written response is graded on a scale of 0-100 as are the quantity and quality of verbal responses.	20%
Documenting pharmaceutical care	9.10	The quantity and quality of recorded communications is assigned a score from 0 - 100.	10%
Participation		The student's participation on medical rounds and in meetings is scored from 0 - 100.	10%

given a signed and dated copy of the spreadsheet with written comments and their final letter grade.

Formal and informal feedback on the APPE is encouraged. How the feedback might affect the APPE is discussed. At the end of each year, the formal student evaluations of the APPE are received, evaluated, and translated into improvements if possible.

RESULTS

From fall semester 2001 through spring semester 2006, 36 PharmD students were precepted on this acute care internal medicine APPE. The

evaluation system described was used for all 36 students. Figure 1 illustrates the grades given to these students. An A minus was the most commonly awarded grade with a B plus second most common. An A was reserved for the best students and was only awarded to 22% of the students. No student was awarded less than a B minus for their final grade. This can be attributed to the intense formative evaluations given to students that were performing poorly. With encouragement and an explanation of the consequences if poor performance continued, all the struggling students were able to significantly improve on the remaining graded activities.

After completing the APPE, the experiential education director asks students to voluntarily and anonymously complete an evaluation of the experience. The evaluation consists of 31 questions about the course and the instructor. Evaluations of the described APPE are available from 32 students, although not every student answered every question. Student answers to the 6 questions most relevant to this article are compiled in Table 2.

Almost all the respondents agreed that the objectives were realistic (97%), and all of them agreed that the objectives were met. All the respondents felt that the assignments were reflective of the material cov-

FIGURE 1. Grade Distribution for the Advanced Pharmacy Practice Experience

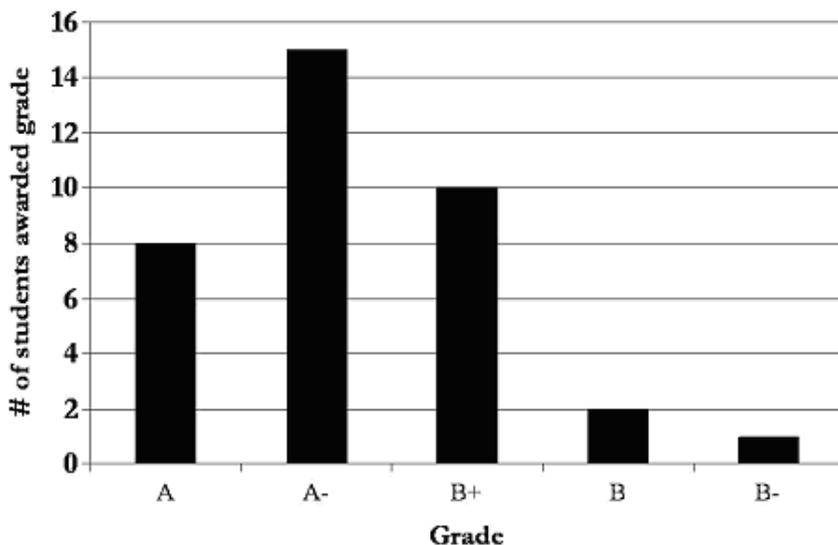


TABLE 2. Student Evaluations of the Advanced Pharmacy Practice Experience (APPE)

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
Objectives were realistic	0	0	0	1	12	19
Course objectives were met	0	0	0	0	16	16
Assignments reflected material	0	0	0	0	12	18
Evaluation was constructive	0	0	1	1	12	18
Overall effective instructor	0	0	0	1	11	19
Overall effective course	0	0	0	1	11	20
* number of students that rated the APPE in each category for each item. n=32						

ered, and 94% of them agreed that the evaluation was constructive. Overall, 97% of the respondents agreed that the course and the instructor were effective.

DISCUSSION

This paper describes an evaluation tool for an acute care APPE. While previous authors have linked CAPE educational outcomes to clerkship activities,¹³ this manuscript is the first description in the literature of using graded assignments linked to outcome expectations specific to the curriculum. In using the tool, students were assigned a well-balanced range of grades. The student evaluations of the APPE were very positive and indicated the student’s satisfaction with the way the APPE was graded. With modification, this tool could be used by other preceptors or directors of experiential learning.

By using graded assignments, the highest levels of the cognitive domain, synthesis and evaluation, were evaluated. In addition, all the out-

come expectations were assessed. Unlike some types of examinations used for testing, the evaluation process described did not consume an inordinate amount of time for faculty to complete. The preceptor met with the students for 90 minutes each day to go over cases and topics. In addition to that time, he spent approximately an additional 3 hours per student per 6 week clerkship to evaluate their performance, complete the spreadsheet and write the formal evaluations. For all of its strengths, this system does have its weaknesses, some of which are modifiable and others inherent.

Presenting a case for a grade could distract from a service oriented goal of providing good patient care. Students understood their case presentations were for a grade, but their monitoring usually led to patient care recommendations. These recommendations were almost always accepted by the medical team so the students also understood that their diligent patient monitoring and assessment affected real patient outcomes. In the opinion of the preceptor, positively affecting patient outcomes gave the students more satisfaction than getting a high score for the presentation.

The assignment of scores for case presentations, follow-up presentations, drug information question responses, and documented communications is subjective. These scores are distributed throughout the APPE so that a few poor days should not have great impact. While it is impossible to remove all subjectivity, efforts could be made toward lessening it. If a similar method of evaluating APPE students was to be used by multiple preceptors, the use of forms and rubrics would be prudent. Beck and Clayton published an article in 1990 that described a valid and reliable instrument that could be used to evaluate a student's case presentation.¹⁴ Rubrics could also be developed to evaluate drug information question responses and documentation of communications. These changes would help alleviate the differences in grading between preceptors.

While this paper describes using graded assignments to evaluate students, in truth it also uses observations ratings. Ten percent of a student's grade is the participation score which is a score given based on observation. Improvements could be made to this part of the evaluation tool described. The participation score could be linked to an objective on professionalism which is often included in the list of a college's outcome expectations. A rubric for evaluating professionalism from the University of Maryland was published in 2007.¹⁵ Using that, or a similar tool should be used to lessen the subjectivity of this score. By com-

binning an evaluation tool that uses graded assignments and one that uses observations ratings, one may lessen the disadvantages of either.

CONCLUSION

This paper describes an evaluation tool that links graded assignments to outcome expectations. The tool was successfully implemented for one preceptor's acute care APPE. It proved to be both complete and practical. By combining the tool described with an observations rating tool and by using forms and scales to lessen the subjectivity, this tool should be successful in acute care settings with multiple preceptors.

Received: January 10, 2007

Reviewed: February 16, 2007

Revised: May 3, 2007

Reviewed and Accepted: May 24, 2007

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doi:10.1300/J060v14n02_06

APPENDIX

The University of Utah College of Pharmacy Terminal Behavioral Objectives: Internal Medicine Acute Care Advanced Pharmacy Practice Experience

At the completion of this professional experience, the student should be able to:

1. Monitor and counsel patients regarding the purposes, uses, and effects of their medications and related therapy.
 - 1a. Obtain a complete and accurate medication history from patients.
 - 1b. Using patient interviews, monitor patients regarding the purposes, uses, and effects of their medications and related therapy.
 - 1c. Counsel patients regarding the purposes, uses, and effects of their medications and related therapy.
2. Apply computer skills and technological advancements to practice.
 - 2a. Utilize information and emerging technologies to assist in the practice of pharmacy.
3. Identify, assess, and solve medication-related problems, and provide a clinical judgment as to the continuing effectiveness of individualized therapeutic plans and intended therapeutic outcomes.
 - 3a. Identify medication-related problems of patients.
 - 3b. Assess and solve medication-related problems of patients.
 - 3c. Provide a clinical judgment as to the continuing effectiveness of individualized therapeutic plans and intended therapeutic outcomes.
4. Evaluate patients and order medications and/or laboratory tests in accordance with established standards of practice.
 - 4a. Evaluate patients and order medications and/or laboratory tests to ensure the appropriateness of the medication order for the patient's age, weight, gender, renal function and disease state.
5. Use clinical data to optimize therapeutic drug regimens.
 - 5a. Use clinical data to design, implement, monitor and modify therapeutic drug regimens in order to maximize the regimen.
6. Design, implement, monitor, evaluate, and modify or recommend modifications in drug therapy to insure effective, safe, and economical patient care.
 - 6a. Design and implement drug therapy to insure effective, safe, and economical patient care.
 - 6b. Monitor and evaluate drug therapy to insure effective, safe, and economical patient care.

- 6c. Modify or recommend modifications in drug therapy to insure effective, safe, and economical patient care.
7. Collaborate with other health professionals.
 - 7a. Collaborate with other health professionals in order to meet the health care needs of patients.
8. Retrieve, evaluate, and manage professional information and literature.
 - 8a. Retrieve professional information, including primary literature.
 - 8b. Critically evaluate professional information for relevance.
 - 8c. Manage the organization of their own professional information and literature.
9. Communicate with health care professionals and patients regarding rational drug therapy, wellness, and health promotion.
 - 9a. Verbally communicate with health care professionals and patients regarding rational drug therapy, wellness, and health promotion.
 - 9b. Provide written communications to health care professionals and patients regarding rational drug therapy, wellness, and health promotion.
10. Evaluate and document interventions and pharmaceutical care outcomes.
 - 10a. Document, with evaluation of such, their patient care activities leading toward specific pharmaceutical care outcomes.