

College of Pharmacy
Outcomes Assessment Process

8/2004

I. Introduction

The new Doctor of Pharmacy program was approved by the University of Rhode Island in the spring of 1998. Prior to the development of the new Pharm.D. curriculum, the Curriculum Committee engaged in reflection and work that culminated in a two-day long faculty retreat in January of 1997 where agreement was reached on curricular goals and objectives. This retreat was guided by the Chair of the Curriculum Committee and facilitated by counsel with Dean Robert Beardsley from the University of Maryland College of Pharmacy.

The College developed, discussed, voted upon and approved the following guiding principles prior to consideration of curricular changes. These principles were suggested by the Curriculum Committee after research and consideration of the ACPE accreditation standards, the CAPE (Center for the Advancement of Pharmacy Education) educational outcomes, and after an evaluation of Doctor of Pharmacy curriculum from existing and fully accredited Doctor of Pharmacy programs in the United States.

Guiding Principles for Curriculum

Guiding Principles	Examples in the curriculum that achieve the principle
Students graduating from the URI College of Pharmacy with the Doctor of Pharmacy degree shall be educated as generalist pharmacy practitioners.	<ul style="list-style-type: none"> • Curriculum established on CAPE competency statements • Curriculum composed of integrated core blocks of information • Liberal amount of interactive learning and laboratory work • Students select pharmacy electives based on their area of interest
In our Doctor of Pharmacy curriculum, there shall be sufficient opportunity to pursue professional electives or “tracks”.	<ul style="list-style-type: none"> • The College has approved eight tracks. Community Practice, Research, Pharmacoeconomics /pharmacoepidemiology, and Pharmacotherapy tracks have the highest student enrollment.
Faculty can not teach everything. <ul style="list-style-type: none"> • The curriculum will be based on “core” material that is essential to the education of a generalist practitioner • Students must also learn independently 	<ul style="list-style-type: none"> • Integrated core classes between pathophysiology, medicinal chemistry, pharmacology, and pharmacotherapeutics • Independent learning skills are developed through IAL, laboratory-based, and experiential courses
The curriculum will include active student learning <ul style="list-style-type: none"> • To develop competencies and proficiency in 	

pharmaceutical skills <ul style="list-style-type: none"> • To develop communication skills • To develop problem-solving skills • To promote life-long learning 	<ul style="list-style-type: none"> • Core coursework • IAL classes • Laboratories in dosage form technology, pharmacology and medicinal chemistry, practice, and experiential learning
The distribution of required pharmacy coursework between the three departments of the College will not change significantly	<ul style="list-style-type: none"> • Previous distribution of didactic courses was about 30-35% across the three departments. Present distribution of material is about 25% for each department. The remaining amounts are IAL and pharmacy elective courses.
Resources sufficient for a quality Doctor of Pharmacy program will be needed	<ul style="list-style-type: none"> • Resources were not formally addressed by the committee when developing the new curriculum.

II. Professional Competencies in Pharmacy Education

Competency based education has been a focus of accrediting agencies for pharmacy education for some years. The following statements in italics are the competency standards from the American Council of Pharmaceutical Education that are used by the college as the basis for evaluating our curriculum for accreditation.

Standard 10. Professional competencies that should be achieved through the College or School of Pharmacy's curriculum in pharmacy are ability to:

- a. Evaluate drug orders or prescriptions, accurately and safely compound drugs in appropriate dosage forms, and package and dispense dosage forms.*
- b. Manage systems for storage, preparation, and dispensing of medicines, and supervise technical personnel who may be involved in such processes*
- c. Manage and administer a pharmacy and pharmacy practice*
- d. Apply computer skills and technological advancements to practice*
- e. Communicate with health care professionals and patients regarding rational drug therapy, wellness, and health promotion*
- f. Design, implement, monitor, and modify or recommend modifications in drug therapy to insure effective, safe, and economical patient care*
- g. 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*
- h. Evaluate patients and order medications and or laboratory tests in accordance with established standards of practice*
- i. Evaluate patient problems and triage patients to other health professionals as appropriate*
- j. Administer medications*
- k. Monitor and counsel patients regarding the purposes, uses, and effects of their medications and related therapy*
- l. Understand relevant diet, nutrition, and non-drug therapies*

- m. *Recommend, counsel, and monitor patients use of nonprescription drugs*
- n. *Provide emergency first care*
- o. *Retrieve, evaluate, and manage professional information and literature*
- p. *Use clinical data to optimize therapeutic drug regimens*
- q. *Collaborate with other health professionals*
- r. *Evaluate and document interventions and pharmaceutical care outcomes*

Outcome expectations for student performance in the professional competencies stated above should be set forth and measured by the College or School. The process of measuring outcome expectations should include student self-assessment of performance in the stated professional competencies.

All required courses in the Doctor of Pharmacy curriculum of the College of Pharmacy were approved in 1998. As a part of this approval process, course objectives and topics were grounded by the Professional Practice-Based Outcomes. The following table tabulates which courses specifically meet the competency statements a-r above.

Professional Competencies by Professional Pharmacy Course

Competency	IAL	APS 318	Early Exp	Pract. Labs	Thera- peutics	Self Care	Phys. Assess	Adv Exp
10a-c		✓	✓	✓				
10d	✓		✓	✓				✓
10e	✓		✓	✓				✓
10 f, g	✓			✓	✓	✓		✓
10 h, i, j								✓
10 k			✓	✓	✓	✓		✓
10 l	NFS 444: Nutrition and Disease				✓	✓		✓
10 m				✓	✓	✓	✓	✓
10 n	Red Cross First Aid					✓		✓
10 o	✓				✓			✓
10p, q, r	✓		✓	✓				✓

III. Measurement of Student Achievement of Competency-based Outcomes

A variety of methods of assessment of student achievement in the competency statements and areas are used. These methods include documentation of recall, application and synthesis of knowledge via objective examination, oral and written presentations, use of technology to complete course assignments, completion of laboratory-based assignments in areas such as compounding, dispensing, manufacturing, and management of pharmaceutical services, and documentation of performance by the preceptor in both early experiential and advanced experiential courses and the use of portfolios. The following table tabulates the method of documentation used in each of the practice-related courses.

Documentation of Student Performance

Method of Evaluation	IAL	APS 318	Early Exp	Pract. Labs	Thera- peutics	Self Care	Phys. Assess	Adv Exp
examination		✓			✓	✓		
Oral presentation	✓		✓	✓		✓	✓	✓
Written	✓					✓		✓
Technology	✓	✓	✓	✓			✓	✓
Portfolio	✓							✓
Faculty observes and documents skill	✓	✓		✓		✓	✓	✓
Preceptor observes and documents skill			✓				✓	✓

Continuous Assessment of the Curriculum

A system of curriculum outcome assessment was formally instituted in the fall of 2000 in conjunction with the initial class beginning their 1st professional year of the new pharmacy program. The overall goal of the curricular assessment process is to demonstrate that the College is meeting its mission with respect to appropriately educating students to become pharmacists. Specific objectives of the curriculum assessment process for the Doctor of Pharmacy program are to: understand our student body, improve student learning, document student problem-solving skills, improve student satisfaction with the College curriculum, document integration of content knowledge, and to ensure that our graduates meet the professional practice-based outcomes. The curriculum outcome assessment process is currently a component of the College's Curriculum Committee and is managed by the Chair of that Committee. Members of this committee are equally distributed from each of the departments of the College and include two student members from different years of the professional curriculum. The evaluation process is systematic, on-going, and responsive to the needs of both students and faculty. The evaluation process also seeks to collect and utilize a wide range of type of data in order to provide a complete and robust "picture" of the curriculum. A formal presentation of the "State of the Curriculum" is a continuing part of the College's faculty meetings building on evidence and information from past years. The major components of the curriculum assessment include background demographic information about the student body, quantitative scores in professional courses, qualitative data from student surveys and portfolios, and a yearly "milestone" exam.

The Curriculum Committee desires to better understand the strengths and weaknesses of our student body. Data on the background demographics of Doctor of Pharmacy students is obtained yearly from the University's institutional research department. This data, collected in electronic form, provides demographic information by academic year on SAT scores, high school size and rank, predicted grade point average, race and ethnicity, citizenship, gender, home state; and registration, entry tuition, and centennial scholar status. As an example, the following figure identifies some of the demographic data presented to the College faculty.

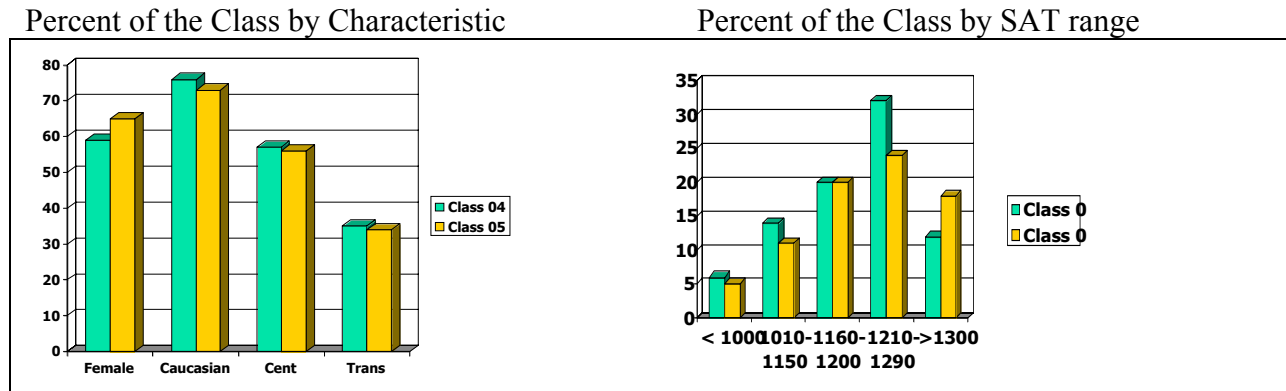


Figure Demographic Characteristics of Class 2004 and Class 2005

The outcome assessment process of the Curriculum Committee also gathers quantitative scores achieved by students in the professional years of the curriculum to document student learning in classes. This information is collected from the Office of Student Affairs at the College and is entered into electronic data bases that are linked with the demographic data on the students. Collection of this information allows the Curriculum Committee and the College to identify areas of success and weakness, as evidenced by student grades, so that improvement in the curriculum can be discussed and planned. For instance, the grade point average is calculated from student grades in the fall and spring semester. This calculation has given data to the faculty that shows a student body experiencing more academic difficulty in the fall of the 1st professional year than in the following spring which, in conjunction with other data from the assessment process, is leading to change in the curriculum. Because the assessment process is continuous and presentation of the data to the faculty is occurring on a yearly basis, improvement by the students can be verified. The figure below illustrates that the students perform better in the spring semester of the 1st professional year and also how the Class of 05 is performing better than the Class of 04. We believe this achievement resulted from faculty consideration of the data and subsequent implementation of course and curricular change.

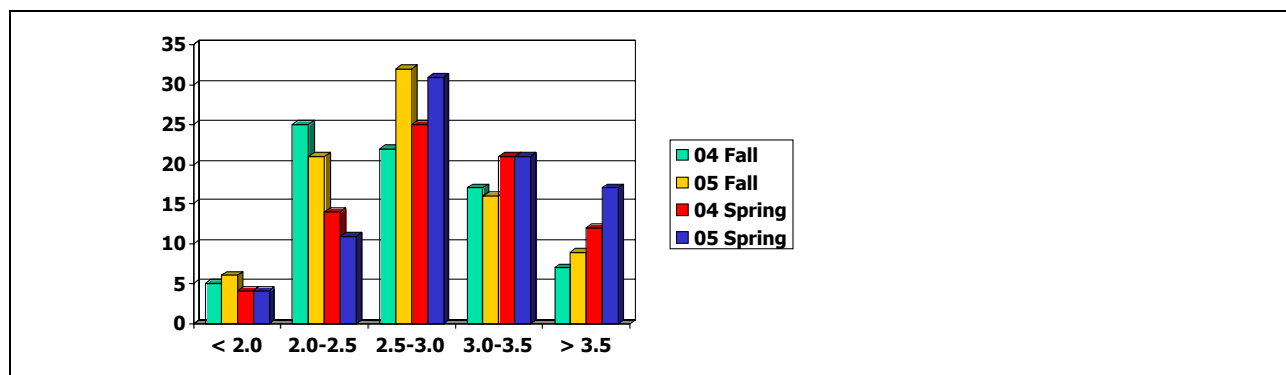


Figure. QPA: Class of 2004 and Class of 2005

Qualitative data is also collected from students by the administration of the student satisfaction surveys at the end of each academic year and through the use of student portfolios. Many faculty administer their own student satisfaction surveys in addition to the University sponsored “Student Evaluation of Teaching” or SETs for their individual courses; however this

section of the report is presenting the data from student input regarding each year of the professional curriculum.

Students are asked to anonymously respond to approximately 30 questions that solicit their opinions on the overall quality and clarity of faculty instruction, satisfaction with the information learned and grades earned, satisfaction with the integrated core as a curriculum structure, and acceptance and satisfaction with the use of various technologies in the coursework. Students are also asked for their suggestions about ways to improve the curriculum that year via open ended questions. Information from the student satisfaction survey is also presented to the faculty at the “State of the Curriculum” presentation each year.

Qualitative information is also gathered through the use of student portfolios. Students are instructed in the first offering of the IAL series regarding the use of portfolios to document and illustrate their accomplishments. IAL instructors evaluate and provide feedback to the students each semester regarding their portfolios. In the Advanced Pharmacy Practice Experiences, students will continue to gather evidence of their work as they progress through each rotation. Areas of content in the portfolio include a curriculum vitae, student goals and objectives for each rotation, written papers, handouts from oral presentations, patient assessments, intervention documentation forms, and the performance assessment tool from past rotations. Faculty are encouraged to evaluate the student’s portfolio at the beginning of each rotation and comment on areas where the student should concentrate effort in order to improve their pharmaceutical care skills. This area of assessment continues to change rapidly and requires more time to properly develop. The use of e-portfolios is under consideration.

The Curriculum Committee has developed a milestone exam to evaluate and document the integration of information attained within the curriculum. This exam is an end of term (annual) assessment that is cumulative and requires students to integrate knowledge learned across courses. Our rationale for doing this type of assessment is to:

- document that integration across courses is occurring
- demonstrate that students can use the full component of knowledge from courses without much in the way of remedial work
- detect poor integration for student feedback and to help promote student success
- document whether the early experiences are having an impact on learning
- measure the effectiveness of the overall curriculum (over time)

Furthermore, we will provide feedback on learning to the students, evaluate whether or not the competency goals that faculty used to ground courses are being met, and provide feedback to course instructors on areas of student strength and weaknesses. During the summer of 2003, an “Assessment of Student Performance on the Milestone Examination” process was developed so that each student could receive individualized information about their achievement. This form provides students with content specific information from the milestone exams. It allows for specific feedback about strengths and weaknesses in integrated knowledge of pharmacology, pharmacotherapeutics, pharmaceuticals, etc by providing students with a stratified analysis of their performance on each section of the milestone exam.

The milestone exam for the 1st, 2nd, and 3rd professional year of the curriculum is a 50-item multiple choice test developed and validated by faculty and practitioners. Faculty and pharmacy practitioners (affiliated with the College) are asked to develop exam questions using a standardized format based on the course content offered that year. Question writers have access to course syllabi, text, and course exam questions to facilitate writing the questions. Faculty who create the exam questions are knowledgeable in the general content area, but do not teach the material in our program. Question writers are asked to rate their questions in the following areas: level of difficulty, type of question (recall, application, synthesis), question content (such as pathophysiology, pharmacotherapeutics, etc.), and identify the competency standard linked to the question.

Once the questions are written, a question item validation workshop is held composed of teams of faculty, senior students, and practitioners. The questions are validated by this team for accuracy and or agreement in the rating areas (standard, level of difficulty, type of question, etc.) and for accuracy of question information, pharmaceutical importance of the question, and what the perceived consequence would be to patient care if a student did not correctly answer the question. Questions may be modified or improved by the team or discarded if appropriate. The milestone exam is then created by categorizing the questions by both content, question structure, and level of difficulty. Questions are randomly selected to form an exam that is weighted by content amount based on the academic year, with about half of the question type as “factual recall” and about half of the question level of difficulty as “easy”. At the present time, we have developed 1st, 2nd and 3rd professional year milestone exams (the 1st year exam has been administered to three classes, the 2nd year to class of 2004 and 2005 and the 3rd year exam to the class of 2004 only). The exam continues to be validated and improved. Early information from this process shows a modest deficit in knowledge in the area of statistics which the Curriculum Committee is evaluating.

An additional outcome measure for our student population is the rate of passage on the NAPLEX licensing exam. The following table contains data for URI graduates taking the NAPLEX exam for the first time. Yearly passage rates are high ranging from 95-100%. The first graduates of the new Doctor of Pharmacy program were eligible for the NAPLEX exam in June, 2004.

Aggregate Results NAPLEX Scores (first-time candidates; URI)

Date	Average URI Score *	Average National Score	Proportion Passing (%)	Overall Passage
2002				99%
Jan-Apr n=14	100.79	95.13	98	
May-Aug n=58	103.97	103.0	100	
2001				96%
Jan-Apr n=14	102.14	94.54	100	
May-Aug n=58	102.45	103.35	94.8	
Sep-Dec n=8	96.75	94.22	100	

2000				95%
Jan-Apr n=16	102.9	96.5	87.5	
May-Aug n=65	104	101.85	96.9	
Sep-Dec n=4	102.5	96.48	100	
1999				98%
Jan-Apr n=23	94.09	95.86	95.65	
May-Aug n=53	103.21	NA	98.0	
Sep-Dec n=6	96.3	97.3	100	
1998				96%
Feb n=33	102.7	97.3	100	
June n=51	102.0	101.98	95.8	

* A normative interpretation of average school scores reveals that URI graduates are, on average, between the “high score” and “average” score range

Conclusion and areas of continued work

Course change has most often occurred from the knowledge gained through evaluating both the quantitative and qualitative curricular assessment data. The following table lists some examples of the issues identified through this process and the steps that were taken, or those that are in progress, to address the areas of concern.

Curricular Assessment

Assessment Tool	Area of Concern	Outcome	Status/Date
Quantitative: grades in coursework	1 st professional year Fall performance not optimal	Curriculum committee is evaluating the sequence of course work	In progress
Qualitative: student satisfaction survey	1 st professional year spring integrated core had too few exams that covered too much material	Faculty offered more frequent and shorter exams	Completed spring 2002
Quantitative and qualitative	2 nd professional year core information rushed with insufficient time for some topics; grades were sub-optimal	2 nd professional year spring Core class increased by 1 credit unit to allow for better instruction of molecular medicine topics	Completed Spring 2003
Qualitative: student survey	1 st professional year spring IAL was “too much work” for a one-credit course	The number of clinical cases was reduced by 1	Completed Spring 2002

Qualitative: student survey	Scheduling: Courses taught in long blocks of time	Many courses first offered as 3-hour blocks once weekly are now offered twice a week for 1.5 hours	Completed
Qualitative and milestone exam	Deficit in knowledge of basic statistics	CC is evaluating how best to meet knowledge in this area	In progress
Overall	Lack of physical assessment course	Requirement for competency was set by the CC and faculty and a course was approved to meet this need (intersession instruction)	Completed Spring 2003
Overall	Are we meeting the professional competencies as outlined in the course proposals?	A subcommittee was formed to evaluate this outcome	In progress
Overall	Do students receive sufficient elective choice in the advanced practice experiences?	Faculty from Pharmacy Practice met and evaluated the issues relating to length and variety of rotations. They recommended that rotations be changed from a 4 by 7.5 week to 6 by 5.0 week format.	Passed by the Curriculum Committee and the College of Pharmacy in 02/03. Approved by the Faculty Senate and implemented.

The College of Pharmacy achieved accreditation in January of 2004 with plans to continue its assessment program in conjunction with strategic planning. In October 2004, the College will meet again in an all-day retreat to evaluate its mission statements. The College hopes to further improve the assessment process by linking our mission statements with measurable outcomes and to also consider the best administrative model to facilitate this work.

Norma J. Owens, Pharm.D.
 Chair, Department of Pharmacy Practice, and
 Chair, Curriculum Committee of the College of Pharmacy