

# **UCI Pharmaceutical Sciences Assessment Program Summary Report**

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## **Project Title**

Undergraduate Assessment of Learning Outcomes and Overall Personal Satisfaction of the Pharmaceutical Sciences Major.

## **Project Team**

Project Leader: Mahtab Jafari; Participating Pharmaceutical Sciences Faculty: Celia Goulding, Tom Poulos, Rommie Amaro, Young Kwon, Lawrence Plon, Andrej Luptak, and Rainer Reinscheid; Student Affairs Officer: Whitney Stanton

## **Project Abstract**

In Fall 2010, we proposed to develop a new method for assessing how well our students achieve the learning objectives of our major. We designed and implemented an assessment program with two components: 1) an online case study that evaluated whether students achieved major learning outcomes. This case was administered immediately following the completion of Pharmaceutical Sciences Upper Division Courses at the end of the Spring Quarter of the senior year, and 2) an online questionnaire that evaluated our students' experience in the major. Students answered case-based questions that required a strong knowledge base, analytical and critical thinking skills. We were able to successfully implement our assessment program in the spring quarter of 2011. Our review and analysis of the case study assignments and students' responses provided us valuable information on the students' mastery of the learning objectives of our major and also the students' experience in our new Pharmaceutical Sciences major at UCI.

## **Learning Outcomes**

The Pharmaceutical Sciences major has several learning objectives to help students develop their knowledge, critical thinking, communication and leadership skills to prepare for successful careers in either pharmaceutical and biotechnology industries, or to prepare for graduate studies. The main learning objectives of our curriculum are addressed in our upper division courses.

This assessment program will evaluate whether students were able to achieve the learning outcomes of our B.S in Pharmaceutical Sciences:

1. Demonstrate an understanding of various stages of drug development and discovery, from identifying potential molecules to clinical studies.
2. Demonstrate an understanding of key areas of research and practice in pharmaceutical sciences, such as medicinal chemistry, physical chemistry, molecular pharmacology, and pharmacotherapy.

3. Demonstrate an understanding of the fundamental principles of pharmaceutical research including design, methods, data analysis and bioethics.
4. Demonstrate written and verbal communication skills.
5. Teach students, in an active learning environment, the tools to become life-time learners.

Throughout our curriculum, students will integrate knowledge, attitudes and skills in a variety of ways to accomplish the above learning outcomes.

### **Assessment Methods**

Our assessment method has two components: 1) To assess the understanding of the learning outcomes by performing a case-based test and 2) To assess the students' perception about their learning experience and mastery of their knowledge by answering evaluative questions.

An online program was developed in order to implement these assessment methods. To assess the understanding of the Pharmaceutical Sciences learning outcome, students were expected to use the knowledge that they learned in the upper division courses to understand a complex case study that is based on their knowledge of molecular pharmacology, medicinal chemistry, biophysical chemistry, biopharmaceutics, pharmacotherapy and bioethics and answer questions that required conceptual understanding and critical thinking. Students were asked to complete this assessment program at the end of the spring quarter of their senior year prior to their graduation. Based on previous experience with our graduating students, we were confident that our students would complete the online assessment program. This case-based exercise was developed by the pharmaceutical sciences faculty. Students were required to synthesize answers for each question based on a solid multidisciplinary knowledge of the material that was presented in the upper division courses and the lower division prerequisite courses. The students had about one month after completing the curriculum to finish this project. Once students began the assignment, they were given two hours to complete it. The questions were based on the content of the case and consisted of multiple choice questions related to the content. In addition to answering case-based questions, students were asked to answer questions on their perception of acquired knowledge obtained through required course work and their overall satisfaction with their experience as a Pharm Sci major. This online program was developed in collaboration with EEE.

### **Progress toward Assessment Goals**

The Pharmaceutical Sciences Department received an Assessment Grant in January of 2011 and successfully created and implemented the first Undergraduate Assessment Program in Spring of 2011. The Department utilized UC Irvine's EEE tool to create an online test for the objective assessment of learning goals and an online survey for the subjective assessment of student satisfaction. The test and survey were distributed to all of graduating seniors, which was a total of 20 undergraduate students for 2011. Of those 20 students, 80% completed the test and 70% completed the survey.

## Results

<b>Case/Quiz (Assessment of Achievement of Learning Goals)</b>			
<b># Students Invited to Participate</b>	<b># Responses</b>	<b>Response Rate</b>	
20	16	80%	
<b>Question #</b>	<b># of Correct Responses</b>	<b># Incorrect Responses</b>	<b>% Answered Correctly</b>
1	9	5	56%
2	13	3	81%
3	15	1	94%
4	2	14	13%
5	16	0	100%
6	12	4	75%
7	11	5	69%
8	9	7	56%
9	15	1	94%
10	10	6	63%
11	15	1	94%
<b>Survey (Assessment of Undergraduate Experience in Pharm Sci Major)</b>			
<b># Students Invited to Participate</b>	<b># Responses</b>	<b>Response Rate</b>	
20	14	70%	
<b>Data Highlights</b>			
50% of respondents rated the overall 4-year experience as a Pharm Sci major a 10 out of 10			
100% of respondents rated the program a 7 or above for the overall 4-year experience			
57% of survey respondents rated the last 2 years of the Pharm Sci major a 10 out of 10			
<b>Identified Areas of Strength</b>			
Faculty teaching skills			
Interdisciplinary curriculum			
Preparation for health professional/graduate school			
Student accessibility to faculty			
<b>Identified Areas for Improvement</b>			
Curriculum- pre-pharmacy requirements			
Academic advising/ academic planning			

### **Use of Assessment Results**

Results were reviewed at a faculty meeting in Fall 2011 to discuss the findings, and collectively identifying trends in the results to better understand student learning. For the case based assessment, each question was designed to assess comprehension of specific learning goals. Based on the results, our faculty will be able to identify specific areas of strength and areas of needed improvement within the curriculum. Changes in the major and curriculum will be implemented as necessary. The subjective assessment was able to provide concrete feedback detailing our student's satisfaction with their undergraduate education and preparation for their future. The expressed opinions of our graduates will be taken into consideration when making decisions and changes to undergraduate Pharmaceutical Sciences program as it grows and continues to evolve.

### **Sustainability**

The proposed efforts will be sustained by requesting graduating students to complete the assessment exercise every year. In order to increase students' participation, the assessment exercises will be included as a required activity in a course that will be offered during Spring quarter of the Pharm Sci senior year. As of Fall 2011, there are 250 freshman students in Pharmaceutical Sciences and the major is still growing. We project to have 250-300 students graduating with a B.S. in Pharmaceutical Sciences starting 2013-14 academic year. The students and the Faculty will be guided to understand the value and necessity of evaluation and assessment. Resources to facilitate these efforts will be provided and example work, assignments, and assessments will be kept on file for reference and review.