

Indiana University Purdue University Fort Wayne

Assessment Report: Indirect Measures

Degree or certificate: B.S. in Chemistry

Program: Chemistry

Academic Year: 2009-2010

Program goals

Provide students the opportunity to develop their knowledge and skills in the various areas of chemistry and to prepare them for success in future job or academic opportunities.

Provide students the opportunity to obtain a Bachelor's Degree certified by the American Chemical Society.

Program outcomes

Students will be successful at being admitted to graduate/ professional schools or finding chemically-related jobs.

Assessment measures and criteria	Assessment results
We sent an alumni survey in 2006 to about 240 IPFW graduates with a B.S. degree in chemistry. 48 alumni returned the survey. This survey will be sent out later this year; the results from it will be reported after compilation.	100% of the respondents believed that they received a quality degree from IPFW and 93% believed that their study of chemistry at IPFW adequately equipped them for their present position. 48% of the respondents to the B.S. degree survey agreed that undergraduate research was beneficial to their careers.
We submitted in early 2004 a five-year report to the American Chemical Society (ACS) Committee on Professional Training (CPT).	We have received the ACS CPT's evaluation of our five-year report. The CPT concluded that the Chemistry Department continues to meet the guidelines for ACS certification. Additionally, the CPT commented that the quality of the student undergraduate research reports for CHM 499 needed improvement. The five-year report indicated there were 36 undergraduate chemistry research students in the past 5 years who collaborated with 9 different chemistry faculty members.

<p>We also submitted an annual ACS report detailing, among other information, chemistry degrees awarded in the 2009-2010 academic year.</p>	<p>In the 2009-2010 academic year, there were eight graduates awarded a Bachelor's Degree in Chemistry; four of these were ACS-certified. Of these eight graduates, we are aware of one that has matriculated at a graduate school (biomedical engineering), one at a dental school, and one at a medical school.</p>
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Use of results:

The annual report was reviewed by the departmental Curriculum & Assessment committee and found to be adequate measures of assessment for their kinds. Although the department would typically submit a 5-year report in 2009, modifications to accreditation requirements by the American Chemical Society have extended this deadline indefinitely.

Effect(s) on the program

We have decided to send out an alumni survey every two to three years. The Curriculum & Assessment Committee has decided to add the following questions to the next survey: 1) Would you like the IPFW Chemistry Department to inform you of potential employment opportunities in chemistry? 2) Did you perform research as an undergraduate? Was it beneficial?

We continue to encourage more students to participate in undergraduate research with chemistry faculty.

The Curriculum & Assessment committee assumes the charge of suggesting modifications that improve the quality of all written communication by chemistry majors, especially CHM 499 research reports.

Indiana University Purdue University Fort Wayne

Assessment Report: Direct Measures

Degree or certificate: B.S.in Chemistry

Program: Chemistry

Academic Year: 2009-2010

Program goals

Provide students the opportunity to develop their knowledge and skills in the various areas of chemistry and to prepare them for success in future job or academic opportunities.

Provide students the opportunity to obtain a Bachelor's degree certified by the American Chemical Society.

Program outcomes

Students will significantly increase their knowledge and skills in chemistry.

Assessment measures and criteria	Assessment results
Oral presentations are required of all students enrolled in CHM 495 (Seminar) and CHM 499 (Undergraduate Research). These presentations are given to the Chemistry faculty or are given at undergraduate research conferences. When possible, they are informally discussed among the faculty.	There were two CHM 495 and two CHM 499 oral presentations in the 2009-2010 academic year.
We have administered to all CHM 115 students (every semester including summer I since the fall of 2002) a departmentally-developed assessment exam (Test I) with 42 multiple-choice questions covering topics in general chemistry. We have administered to all CHM 265 students (every fall semester since fall 2002) an assessment exam (Test II) with 14 multiple-choice questions covering topics in organic chemistry. We have administered to all CHM 321 students a 56 multiple-choice question exam (Test III) that is identical to Test I plus Test II. Thus, while Tests I and II serve as pre-tests, Test III serves as a post-test since the chemistry majors enrolled in CHM 321 will have taken	<p>We identified 35 chemistry students who took Test I and Test III. For the 42 questions concerning general chemistry, the average score for the pre-test was 8.7 with a range of scores from 1 to 23 and a standard deviation of 5.4; for the post-test, the average score was 24.6 with a range of scores from 14 to 42 and a standard deviation of 6.9. Each of the 35 students increased their score by at least 5 and the maximum increase was 30.</p> <p>We identified 40 chemistry students who took Test II and Test III. For the 14 questions concerning organic chemistry, the average score for the pre-test was 2.2 with a range of scores from 0 to 5 and a standard deviation of</p>

<p>courses in general and organic chemistry. However, it should be noted that CHM 321 students who did not take general (CHM 115) and/or organic (CHM 265) chemistry at IPFW will not have pre-test scores.</p>	<p>1.3; for the post-test, the average score was 5.5 with a range of scores from 1 to 10 and a standard deviation of 2.1. 27 of the 30 students increased their score by at least 1 and the maximum increase was 8. Two students had fewer correct responses on the post-test than the pre-test; one other student had the same score on both tests.</p> <p>The average percentage correct on the general chemistry test increased from 21% to 59% and on the organic chemistry test increased from 16% to 39%.</p>
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Use of results

The Curriculum & Assessment committee will present a formal proposal to modify CHM 495 and CHM 499 as needed for use as an objective and rigorous ‘capstone’ experience for our students.

A question-by-question analysis of the pre- and post-assessment test results to date has identified the following results:

- 1) for the 42 questions on general chemistry-
 - 34 questions showed major improvement (> 15% absolute increase);
 - 5 questions showed improvement (> 5% absolute increase);
 - 2 questions were unchanged (+ 5% to - 5% absolute change); and
 - 1 question showed a decline (> 5% absolute decrease)

- 2) for the 14 questions on organic chemistry-
 - 9 questions showed major improvement (> 15% absolute increase);
 - 3 questions showed improvement (> 5% absolute increase);
 - 1 question was unchanged (+ 5% to - 5% absolute change); and
 - 1 question showed a decline (> 5% absolute decrease)

Effect(s) on the program

The Curriculum & Assessment committee continues to work on revising curriculum goals and objectives to better align them with the Baccalaureate Framework, and developing a curriculum map to identify what role each course plays in presenting them; upon completion of these tasks, the committee will begin discussion regarding different schemes to improve connectivity of key concepts throughout the curriculum and improve the effectiveness of our assessment.

We will continue to administer these pre- and post-tests and evaluate data annually.

The topics of those questions in the evaluation test that had a greater-than-5% absolute decrease have been passed on to the instructors of general chemistry and organic chemistry for remediation in those courses.