

Annual Report for Assessment of Outcomes – Biology, Communication (For Degree, Certificate or Core Outcomes)

To complete this Assessment Report, please address the questions below, and send to learningassessment@pcc.edu **by June 20, 2011**; subject line: REPORT Assessment [SAC]

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in the previous academic year.

(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes).

In 10-11, all SACs should have reported on the Critical Thinking Core Outcome. Student demonstration of critical thinking was strong for a 100 level course. Although we were generally pleased with our students' critical thinking skills, the process of formally evaluating their skills in the context of the assignment has led to a deeper reflection of improvements that can be made to the assignment to improve critical thinking and attainment of the course outcomes. At this point, instructors at each of the campuses are making modifications and we will return to our focus of assessing critical thinking in the 2012-2013 academic year.

Potentially more important at this point in the process, we are recognizing weaknesses in our assessment tools and their implementation and developing strategies for improvement of our process. For example, while assessing for critical thinking, we had low faculty participation, leading to a small sample size. Only one assignment was used to demonstrate the level of critical thinking near the end of the term. Improvements in design of this assessment could help us assess the improvement of critical thinking skills during the course. Increased understanding of the importance of these assessments will increase faculty participation

2. Identify the outcomes assessed this year, and describe the methods used.
What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)?

(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.i& ii (for Core Outcomes) or 6.B.i & ii (for CTE Degree and Certificate outcomes)

Communications Core Outcome

a. Describe the method(s) you used.

The Biology SAC developed a custom rubric (see attached) to assess the Communication core outcome. Since our courses require the use of scientific terminology and analysis of information using the scientific method, the rubric was structured so that the use of relevant terminologies and vocabulary and critical analysis of information could be assessed concurrently with basic communications skills. The rubric was divided into three components – Reading, Writing and Speech. For each component, outcomes of Exceeds, Meets and Limited were defined.

In order to randomize the artifacts included in the study, each participating CRN used materials and assignments from every fifth student, beginning with the third student on the roster. All students were asked to sign a permission slip, and any students that did not consent to the use of their materials were excluded from the study. In these cases, the next student that gave permission was used, and every fifth student from that point on were then included. Students from the Spring 2011 term only were used in this assessment.

Artifacts were collected from both 100 and 200 level courses. Each course used an assignment(s) relevant to that CRN, so, for some sections, the speech portion of the rubric may not have been used, and in other sections the reading portion of the rubric may not include any data. However, the writing element of the rubric has data for all artifacts used. The writing assignments used included short research papers, analysis of clinical data and case studies, and lab reports. The courses involved in this study include BI 101, BI 103, BI 112, BI 145, BI 212, BI 231 and BI 233, so this study spans both first-year and second-year students, as well those in Biology Majors, Pre-Health Sciences, and other programs. For analysis of the data, all 100-level courses were analyzed as one group, as were the 200-level artifacts.

Upon completion of the assessment, Biology SAC members of the Communications Core Outcomes subcommittee met to informally evaluate the rubric used in assessment. Ease of use, applicability across sections, and meaningfulness of the data acquired were discussed.

b. Results: What did you learn?

For 100-level courses, a total of 73 artifacts were submitted, among these, there is reading data for 29, writing data for 73, and speech data for 18 of the artifacts submitted. For 200 level courses, 42 artifacts were submitted, providing 42 data points for reading and writing and 9 for speech.

With respect to the Reading component for 100 level students, 41.3% exceeded expectations, 55.1% met expectations, and 3.4% had limited ability to meet expectations. For the Writing component, 52% exceeded expectations, 35.6% met expectations, and 12.3% had limited ability to meet the outcomes. For the speech component, 50% exceeded expectations, 44.4% met expectations, and 5.6% had limited ability to meet expectations.

With regard to the Reading component for 200 level students, 66.7% exceed expectations, 30.9% met outcome expectations and 2.4% had limited ability to meet expectations. For the Writing component, 64.2% exceeded expectations, 23.8% met expectations and 11.9% had limited ability to meet expectations. For the Speech component, 44.4% exceeded expectations and 55.6% met expectations.

When comparing the ability to meet the Reading component outcomes between first-year and second-year students, there was an overall improvement from 41.3% exceeds to 66.7% exceeds. Additionally, the percentage that had limited ability to meet expectations decreased from 3.4% to 2.4%. The Writing component shows a similar trend, with the percentage of students exceeding expectations increasing from 52% in 100-level courses to 64.2% in 200-level courses, and a decrease from 12.3% in 100-level courses to 11.9% in 200-level courses with limited ability to meet expectations. There is little change in the Speech component when comparing 100-level to 200-level students.

In addition to comparing all first-year and second-year students in Biology courses, a comparison between BI 112 and BI 231 must also be done. BI 112 is a pre-requisite for BI 231, and these data can provide a very clear assessment as to the progress of a single cohort of students. With regard to the

Writing component, there was an increase in the percentage of students that exceeded expectations from 53.7% of BI 112 students to 61.1% of BI 231 students. From the data, it appears that this change may indicate an overall improvement among students who met expectations in BI 112 (31.7%) as there is a concomitant decrease in students that met expectations in BI 231 (16.7%). For those students with limited ability to meet outcomes, the percentage increased in BI 231 (22.2%) compared to BI 112 (14.6%). Sample sizes for these two courses vary greatly, with 42 artifacts for BI 112 and 18 for BI 231, so the limited number of artifacts for BI 231 may not be wholly representative of those students in that class. Overall, there does appear to be an improvement in meeting the Writing component of the Communications Core Outcome when students progress from BI 112 to BI 231.

Another important comparison is that among 231 and 233 students. Those students in 233 are completing their Anatomy and Physiology sequence, so how they meet outcomes may be a good indicator of how well we are teaching the necessary skills to meet the Communication Core Outcome. With respect to Writing, the overall percentage of students who exceed expectations is higher among BI 231 (61.1%) students than BI 233 (55.6%) students. However, the percentage of students meeting expectations is higher among BI 233 students (44.4%) than BI 231 students (16.7%) and the number of student with limited ability to meet expectations was 22.2% in BI 231 students, but no students had limited ability in BI 233. Overall, it appears that during the progression from BI 231 to 233 that our students are becoming better prepared to meet our Communications Core Outcome.

3. Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of outcomes.

(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)

While much of the data indicates that students are better able to meet outcomes as they progress through the program, there are many shortcomings and areas for improvement for future Communications assessments.

Chiefly among these is the lack of calibration for the assessments conducted in this study. The data may show some overall positive trends, but without calibration, the data may not be as accurate and informative as we like. In the future, all participants will be asked to participate in an assessment calibration.

Additionally, the sample sizes and number of courses participating is quite small for a SAC with such a large number of students. In the future, efforts will be made to ensure that more faculty provide more artifacts.

Even though the data can provide a snapshot of what is happening with our students' ability to meet the expectations of the Communications Core Outcome, we do not have, at this time, enough data to accurately assess if any real improvement is occurring in a single cohort of students.

It is also evident from the data (or lack of it) that the Speech component set forth by the Biology SAC needs improvement. In many cases, no data exists for assessment of this component. This may

indicate that oral communication and assessments that focus on these skills should be adopted and incorporated into these courses. It may also indicate that the rubric and assessments utilized in this assessment need to be altered and adjusted to better assess this component.

Finally, the rubric utilized for this current assessment must be revisited in order to improve it with the intention of more accurately and easily assessing the critical features of each outcome component. Many faculty found it confusing, and felt that a three-tiered breakdown did not give enough nuance to accurately describe our students' abilities.

Environmental Responsibility Core outcome Assessment Rubric for BI 101 Carbon footprint assignment	Level 1 Limited application of knowledge and skills	Level 2 Basic application of knowledge and skills	Level 3 Demonstrates comprehension and is able to apply essential knowledge and skill	Level 4 Demonstrates thorough effective and /or sophisticated application of knowledge and skills
Assess own knowledge, participation and skills in thinking about and acting on environmental issues	<p>Student is aware of what a carbon footprint is</p> <p>Student can name 1-2 contributing factors to their own carbon footprint</p> <p>Student is aware of the concept of carrying capacity of the planet but is not sure how personal resource use relates to carrying capacity</p>	<p>Student is aware of what a carbon footprint is</p> <p>Student can name more than 2 contributing factors to their own carbon footprint</p> <p>Student is aware of the concept of carrying capacity of the planet and knows that typical North American resource use patterns exceed that carrying capacity but is not able to quantify or discuss in detail</p>	<p>Student is aware of what a carbon footprint is and can articulate in detail why that is important</p> <p>Student can name all the major contributing factors to their own carbon footprint</p> <p>Student is aware of the concept of carrying capacity of the planet and knows that typical North American resource use patterns exceed that carrying capacity and is able to quantify and discuss in detail</p>	<p>Student is aware of what a carbon footprint is and can articulate in detail why that is important</p> <p>Student can name all the major contributing factors to their own carbon footprint and discuss the how those factors can be measured or assessed in different ways</p> <p>Student is aware of the concept of carrying capacity of the planet and knows that typical North American resource use patterns exceed that carrying capacity and is able to quantify and discuss in detail.</p>
Analyze community and global environmental issues and develop strategies for informed response	<p>Student is aware that different factors contribute unequally to a carbon footprint but is not aware of the most important factors in their own life style</p> <p>Student is aware that changes to a carbon footprint can be made but is not sure what actions could be taken</p> <p>Student does not have a plan to make realistic lifestyle changes to reduce their carbon footprint</p>	<p>Student is aware that different factors contribute unequally to a carbon footprint and can name 1-2 of the most important categories of contributing factors in their own lifestyle</p> <p>Student is aware that changes to a carbon footprint can be made and can name 1-2 actions that lower their carbon footprint but not necessarily which ones would have the most impact</p>	<p>Student is aware that different factors contribute unequally to a carbon footprint and can name the most important categories of contributing factors in their own lifestyle and is aware of some the components of each.</p> <p>Student has identified areas of their lifestyle that could be altered to reduce their carbon footprint and has brainstormed a list of viable ways to do that</p>	<p>Student is aware that different factors contribute unequally to a carbon footprint and can name all the important categories of contributing factors in their own lifestyle.</p> <p>Student has identified areas of their lifestyle that could be altered to reduce their carbon footprint in all the major categories and has brainstormed a list of viable ways to do that.</p>

Lab 10 Ecological Footprint Pre Test

1. What is a Carbon Footprint?
2. Why is the concept of a Carbon Footprint important?
3. What components of a person's lifestyle (resource use) would affect their Carbon Footprint?
4. Based on the categories of resource use that you came up with for questions 4-rank them in order of importance. In other words what parts of your lifestyle do you think contributes the most to your Carbon Footprint.
5. How do you think your carbon footprint compares to people in other parts of the world?
6. How many Earths would it take to support all 6.8 billion people on the planet if they all had your footprint? _____
7. What could you do to reduce your carbon footprint?

Annual Report for Assessment of Outcomes – Biology Community and Environmental Responsibility

To complete this Assessment Report, please address the questions below, and send to learningassessment@pcc.edu by **June 20, 2011**; subject line: REPORT Assessment [SAC]

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in the previous academic year.
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See our annual report for assessment of the communication outcome for information on outcome assessments carried out in 2009-10.

2. Identify the outcomes assessed this year, and describe the methods used.
What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)?

Environmental Awareness and Community Responsibility Core Outcome

a. Describe the method(s) you used.

The Biology SAC developed a custom rubric (see attached) to assess the environmental awareness and community responsibility core outcome for students of our non-majors general biology course, BI 101. We chose this course because it represents a broad range of students with varied backgrounds, interests and goals. It also one of our largest student FTE courses, so our assessment has the potential to tell us how well we are doing for the greatest number of students. For many students, this is the only biology course they take at PCC. It is important to us that we achieve this outcome particularly for this group.

For assessment, we used the results of an assignment that students completed after engaging in a lab activity that teaches students about their ecological footprint on the planet. The assignment is a series of 7 questions which students answer in written form during the last lab period of the term. By this point they have presumably learned basic principles of ecology and population biology, including human impacts on the planet.

Assignments were collected from students at two campuses (Sylvania and Rock Creek), from a total of 7 different CRNS (and 7 different instructors). Each assignment was presented to the students as an extra credit or mandatory quiz, depending on the instructor. Instructors gave the quiz twice, once before and once after completing the ecological footprint activity. Students were informed that their work would be used for college assessment, and were asked to sign a sheet indicating permission to use their work. Each instructor used the rubric to evaluate how well the outcomes were met.

b. Results: What did you learn?

We learned several important things from this assessment activity. First, data collected from 135 students suggest that the environmental/community responsibility outcome is being achieved at a low level. The average level of achievement across the district was 1.60 out of a possible 4.0. A very narrow range of skill levels were demonstrated. Nearly all students were scored as achieving either Level 1 (limited application of knowledge and skills) or Level 2 (basic application of knowledge and skills). Only a few students achieved Level 3 (demonstrates comprehension and is able to apply essential knowledge and skill), and no student achieved Level 4 (demonstrates thorough, effective and/or sophisticated application of knowledge and skills).

We also understand from this assessment process that the assignment we chose did not accurately allow us to measure the real level of achievement of this core outcome. The rubric we chose is, in hindsight, designed for a more thorough activity such as a term paper, or at least a written assignment that encourages students to expand on their knowledge of the concept of a carbon footprint. The assignment was given during a lab as an activity that was either extra credit or for only a few points- it appeared that many students did not put very much effort into it. This greatly influenced the scoring via the rubric. Most student responses to the 7 questions on the assignment were only one sentence in length. Therefore, achievement of level 4 on our rubric was not possible.

The assignment was given to each student twice, both before and after the laboratory exercise that is meant to teach students about their ecological footprint on the earth. A comparison of scores suggests that the activity does boost student mastery of the outcome, but not by much. Average scores before the activity was 1.36 and after, 1.60.

Average scores on assessment were similar across Biology 101 CRNs. Most scores were similar, except for one course where the average score was much higher (RC 3; see below). This outlier was probably a result of instructor interpretation of the rubric.

Course	Number of students	Avg. score pre-assignment	Avg. score post-assignment
RC 1	23	1.37	1.15
RC 2	23	1.65	1.96
RC 3	20	1.85	2.65
RC 4	22	0.84	1.11
SY 1	20	0.88	1.30
SY 2	27	1.59	1.40
total	135	1.36	1.60

Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of outcomes.

There are several shortcomings and areas for improvement for future assessments of the environmental and community responsibility outcome. Our biggest shortcoming is in the matching of the assessment tool to the assessment itself. We used a rubric that did not

accurately assess the students' mastery of the outcome. The rubric itself is well-designed and complete, but the range of levels of mastery could not be demonstrated by the assignment we chose for assessment.

We need to either develop a new assignment to assess, or we should use a different rubric for assessment of this outcome. Development of a new assignment is not a preferable choice; it would amount to "teaching to the test" and require a lot of restructuring of assignments, which is not the goal of this activity. Instead, we should choose a different assignment to assess, and modify the rubric. We need to assess something that is worth more points, and as such is more valuable to the students. We want to assess them on material for which they have put in more effort. A term project would be best for assessment, but there is not one common term project across the district. We may have to come up with several assessment rubrics, each one unique to the assignment, for this to work. We could probably make minor changes to the rubric we used, for each assignment. Our rubric was specific to the carbon footprint assignment, but could easily be modified to be more general.

We also understand from this activity that our students are not mastering this outcome. Such mastery would probably require a major change in curriculum for Biology 101. Perhaps a few minor changes with regard to emphasis of environmental responsibility in this course would provide the platform for students to achieve this outcome at a higher level (if not mastery, at least closer to it).

Prior to this year, few instructors were even aware of this college core outcome. This exercise has brought it to our attention, and we plan to have more conversations about how to better address this outcome in BI 101 and other courses. The team of SAC members who worked on this assessment, did not participate in last year's assessment of critical thinking. So the process was relatively new to us. The next time we do this assessment, we recommend the following changes:

1. Create a bigger district-wide team for assessment. We did not have a representative from Cascade campus on this assessment.
2. Keep BI 101 as a course for student assessment, but add additional courses. We do not know how well our other biology courses are addressing this outcome.
3. Choose a term project for assessment, and modify the assessment rubric so it matches the project.
4. Inform instructors (and students) that this outcome is important to the college. This is on the SAC agenda for our fall meeting. Department chairs will be encouraged to share this information with adjunct instructors, particularly new adjunct instructors who have not been part of this assessment process.

5. Lead instructors for BI 101 should meet and discuss how to better teach this outcome. This may require replacing some current course content (and current learning objectives) with content specific to this outcome. This will require evaluation, input and final decision-making at the SAC level.