

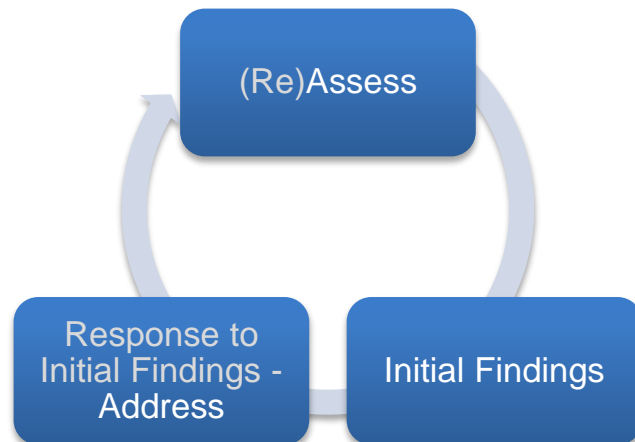
Subject Area Committee Name: CH

Core Outcome Being Reassessed: Professional Competency

Contact Person:

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Use this form if your assessment project is a follow-up reassessment of a previously completed initial assessment. The basic model we use for core outcome assessment at PCC is an “assess – address – reassess” model.



The primary purpose for yearly assessment is to improve student learning. We do this by seeking out areas of concern, making changes, reassessing to see if the changes helped.

- Refer to the help document for guidance in filling out this report. If this document does not address your question/concern, contact [Wayne Hooke](#) to arrange for coaching assistance.
- Please attach all rubrics/assignments/etc. to your report submissions.
- **Subject Line of Email:** Assessment Report Form (or ARF) for <your SAC name> (Example: ARF for MTH)
- **File name:** SACInitials_ARF_2016 (Example: MTH_ARF_2016)
- SACs are encouraged to share this report with their LAC coach for feedback before submitting.
- Make all submissions to learningassessment@pcc.edu.

Due Dates:

- **Planning Sections of LAC Assessment or Reassessment Reports: November 28th, 2016**
- **Completed LAC Assessment or Reassessment Reports: June 16th, 2017**

Please Verify This Before Beginning this Report:

This project is the second stage of the assess/reassess process (if this is not a follow-up, re-assessment project, use the LAC Assessment Report Form LDC. Available [here](#).)

Initial Assessment Project Summary (previously completed assessment project)

*Briefly summarize the main findings of your **initial** assessment. Include either 1) the frequencies (counts) of students who attained your benchmarks and those who did not, or 2) the percentage of students who attained your benchmark(s.)*

81.3% of students assessed last year obtained the benchmark of 70% or higher on our assessment tool.

Briefly summarize the changes to instruction, assignments, texts, lectures, etc. that you have made to address your initial findings:

We wrote clear learning objectives for CH151. These learning objectives were circulated to all PT and FT faculty during summer 2016 to help standardize the course across the district. We want to test to see if faculty working from these learning objectives will boost the percentage of students achieving the 70% benchmark on the assessment tool.

If you initially assessed students in courses, which courses did you assess:

CH151

If you made changes to your assessment tools or processes for this reassessment, briefly describe those changes here:

We used last year's assessment tool Fall term so we can directly compare results from this year (with the new objectives in place) and last year (before the objectives). We then modified the assessment tool for Winter term to make it more consistent with the new objectives. Also, we want to correlate the data taken Fall term with final grades in Winter term CH221 classes to understand how well performance in CH151 leads to student success in CH221.

1. Core Outcome

1A. PCC Core Outcome: professional competency

1B. How does your discipline interpret the outcome you are reassessing?

Our 200-level courses are designed to prepare our students to become working members of the scientific community. Mastery of the learning outcomes is tied to their future ability to function in the scientific community and to be accepted as a member.

1C. Briefly describe how this outcome is/might be important/useful to your students.

CH151 is a preparatory class for CH221. We will assess students' skills necessary to enter CH221 and succeed in this level of chemistry.

2. Project Description

2A. Assessment Context

Check all the applicable items:

Course-based assessment.

Course names and number(s): CH151

Type of assessment (e.g., essay, exam, speech, project, etc.): multiple choice exam

Are there course outcomes that align with this aspect of the core outcome being investigated? Yes No

If yes, include the course outcome(s) from the relevant CCOG(s): Develop chemical concepts, math skills and problem solving skills essential for successful completion of future studies in chemistry and other science courses.

Common/embedded assignment in all relevant course sections. An embedded assignment is one that is already included as an element in the course as usually taught. Please attach the activity in an appendix. If the activity cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):

Common – but not embedded - assignment used in all relevant course sections. Please attach the activity in an appendix. If the activity cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):

Practicum/Clinical work. Please attach the activity/checklist/etc. in an appendix. If this cannot be shared, indicate the type of assessment (e.g., supervisor checklist, interview, essay, exam, speech, project, etc.):

External certification exam. Please attach sample questions for the relevant portions of the exam in an appendix (provided that publically revealing this information will not compromise test security). Also, briefly describe how the results of this exam are broken down in a way that leads to nuanced information about the aspect of the core outcome that is being investigated.

- SAC-created, non-course assessment.** Please attach the assessment in an appendix. If the assessment cannot be shared, indicate the type of assignment (e.g., essay, exam, speech, project, etc.):
- Portfolio.** Please attach sample instructions/activities/etc. for the relevant portions of the portfolio submission in an appendix. Briefly describe how the results of this assessment are broken down in a way that leads to nuanced information about the aspect of the core outcome that is being investigated:
- Survey**
- Interview**
- Other.** Please attach the activity/assessment in an appendix. If the activity cannot be shared, please briefly describe:

In the event publicly sharing your assessment documents will compromise future assessments or uses of the assignment, do not attach the actual assignment/document. Instead, please give as much detail about the activity as possible in an appendix.

2B. How will you score/measure/quantify student performance?

- Rubric** (used when student performance is on a continuum - if available, attach as an appendix – if in development, attach to the completed report that is submitted in June)
- Checklist** (used when presence/absence rather than quality is being evaluated - if available, attach as an appendix – if in development, attach to the completed report that is submitted in June)
- Trend Analysis** (often used to understand the ways in which students are, and are not, meeting expectations; trend analysis can complement rubrics and checklist)
- Objective Scoring** (e.g., Scantron-scored examinations)
- Other** – briefly describe:

2C. Type of assessment (select one per column)

- | | |
|---|--|
| <input checked="" type="checkbox"/> Quantitative | <input checked="" type="checkbox"/> Direct Assessment |
| <input type="checkbox"/> Qualitative | <input type="checkbox"/> Indirect Assessment |

If you selected 'Indirect Assessment', please share your rationale:

Qualitative Measures: projects that analyze in-depth, non-numerical data via observer impression rather than via quantitative analysis. Generally, qualitative measures are used in exploratory, pilot projects rather than in true assessments of student attainment. Note that the **use of a numerical rubric is considered quantitative analysis**, even if the artifacts under consideration are not based on quantitative calculations (e.g. an essay scored

by a rubric counts as quantitative in the context of assessment).

Indirect assessments (e.g., surveys, focus groups, etc.) do not use measures of direct student work output. These types of assessments are also not able to truly document student attainment.

2D. Check any of the following that were used by your SAC to create or select the assessment/scoring criteria/instruments used in this project:

- Committee or subcommittee of the SAC collaborated in its creation
- Standardized assessment
- Collaboration with external stakeholders (e.g., advisory board, transfer institution/program)
- Theoretical model (e.g., Bloom’s Taxonomy)
- Aligned the assessment with standards from a professional body (for example, The American Psychological Association Undergraduate Guidelines, etc.)
- Aligned the benchmark with the Associate’s Degree-level expectations of the Degree Qualifications Profile
- Aligned the benchmark to within-discipline post-requisite course(s)
- Aligned the benchmark to out-of-discipline post-requisite course(s)
- Other (briefly explain: _____)

2E. In which quarter will student artifacts (samples of student work) be collected? If student artifacts will be collected in more than one term, check all that apply.

- Fall** **Winter** **Spring** **Other** (e.g., if work is collected between terms)

2F. What student group do you want to generalize the results of your assessment to? For example, if you are assessing performance in a course, the student group you want to generalize to is ‘all students taking this course.’

All students taking this course.

2G. There is no single, recommended assessment strategy. Each SAC is tasked with choosing appropriate methods for their purposes. Which best describes the purpose of this project?

- To measure established outcomes and/or drive programmatic change**
- To participate in the Multi-State Collaborative for Learning Outcomes Assessment**
- Preliminary/Exploratory investigation**

If you selected ‘Preliminary/Exploratory’, briefly describe your rationale for selecting your sampling method:

2H. Which will you measure?

- the population** (all relevant students – e.g., all students enrolled in all currently-offered sections of the course)
 a sample (a subset of students)

If you are using a sample, select all of the following that describe your sample/sampling strategy (refer to the Help Guide for assistance):

- Random Sample** (student work selected completely randomly from all relevant students)
 Systematic Sample (student work selected through an arbitrary pattern, e.g., ‘start at student 7 on the roster and then select every 5th student following’; repeating this in all relevant course sections)
 Stratified Sample (more complex, consult with an LAC coach if you need assistance)
 Cluster Sample (students are selected randomly from meaningful, naturally-occurring groupings (e.g., SES, placement exam scores, etc.)
 Voluntary Response Sample (students submit their work/responses through voluntary submission – e.g., via a survey)
 Opportunity/Convenience Sample (only some of the relevant instructors are participating)

The last three options in bolded red have a high risk of introducing bias. If your SAC is using one or more of these sample/sampling strategies, please share your rationale:

2J. Briefly describe the procedure you will use to select your sample (including a description of the procedures used to ensure student and instructor anonymity).

Sample will be all students taking CH151 during Fall term and Winter term.

2K. Follow this link to determine how many artifacts (samples of student work) you should include in your assessment: <http://www.raosoft.com/samplesize.html> (see screen shot below).

Start with the number of students you estimate will be enrolled in the course(s) from which you will draw the sample – that is your “population.” Enter the other numbers as indicated in the screenshot. The sample size calculator will tell you how many artifacts you need to collect. Enter that number below:

218. Nevertheless, we are examining all students in the class.

Raosoft Sample size calculator

What margin of error can you accept?
5% is a common choice

What confidence level do you need?
Typical choices are 90%, 95%, or 99%

What is the population size?
If you don't know, use 20000

What is the response distribution?
Leave this as 50%

Your recommended sample size is

10 %

90 %

105

50 %

42

The margin of error is the amount of error that you can tolerate. If 90% of respondents answer yes, while 10% answer no, you may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55. Lower margin of error requires a larger sample size. **Use 10% and 90% in these boxes.**

Confidence level is the amount of uncertainty you can tolerate. Suppose that you have 20 yes-no questions in your survey. With a confidence level of 95%, you would expect that for one of the questions (1 in 20), the percentage of people who answer yes would be more than the margin of error away from the true answer. The true answer is the percentage you would get if you exhaustively interviewed everyone. Higher confidence level requires a larger sample size. **Enter the total number of students currently enrolled in all sections of the courses you are assessing here.**

For each question, what do you expect the results will be? If the sample is skewed highly one way or the other, the population probably is, too. If you don't know, use 50%, which gives the largest sample size. See below under **More information** if this is confusing. **Measure this many students.**

This is the minimum recommended size of your survey. If you create a sample of this many people and get responses from everyone, you're more likely to get a correct answer than you would from a large sample where only a small percentage of the sample responds to your survey.

3. Project Mechanics

3A. Does your project utilize a rubric for scoring? Yes No

If 'No', proceed to section B. If 'Yes', complete the following:

Which method of ensuring consistent scoring (inter-rater reliability) will your SAC use for this project?

Agreement – the percentage of raters giving each artifact the same/similar score in a norming session; ideally, that will be 75% agreement or greater.

If you are using agreement, describe your plan for plan for conducting the “norming” or “calibrating” session:

Consensus - all raters score all artifacts and reach agreement on each score

Consistency* – raters’ scores are correlated: this captures relative standing of the performance ratings - but not precise agreement. Briefly describe your plan:

Notes: the agreement method is the most frequently used for assessment, but the **calculation of inter-rater reliability is also among the more challenging issues** within assessment as a whole. If your SAC is unfamiliar with norming procedures, contact your assessment coach, or if you don’t know who your coach is, contact LAC Vice Chair [Chris Brooks](#) to arrange for coaching help for your SAC’s norming session.

The consistency method is not generally recommended; see the help guide for details.

3B. Have performance benchmarks been specified?

The fundamental measure in educational assessment is the number of students who complete the work at the expected/required level. We are calling this SAC-determined performance expectation the ‘benchmark.’

Yes
 No

If yes, briefly describe your performance benchmarks, being as specific as possible (if needed, attach as an appendix):

A benchmark of 70% on the assessment tool was decided upon to indicate that students have developed chemical concepts, math skills, and problem solving skills essential for successful completion of future studies in chemistry and other science courses.

If no, what is the purpose of this assessment? (For example, this assessment will provide information that will lead to developing benchmarks in the future; or, this assessment will lead to areas for more detailed study; etc.)

3C. The purpose of this assessment is to have SAC-wide evaluation of student work, not to evaluate a particular instructor or

student. Before evaluation, remove student-identifying information (and, when possible remove instructor-identifying information). If the SAC wishes to return instructor-specific results, see the Help Guide for suggestions on how to code and collate. **Please share your process for ensuring that all identifying information has been removed.**

Remove names from scantrons once all are collected and tallied.

3D. Will you be coding your data/artifacts in order to compare student sub-groups? Yes No

If yes, select one of the boxes below:

student's total earned hours previous coursework completed ethnicity other

Briefly describe your coding plan and rationale (and if you selected 'other', identify the sub-groups you will be coding for):

3E. Ideally, student work is **evaluated** by both full-time and adjunct faculty, even if students being assessed are taught by only full-time and/or adjunct faculty. Further, more than one rater is needed to ensure inter-rater reliability. If you feel only one rater is feasible for your SAC, please explain why:

Who will be assessing student work for this project? Check all that apply.

- PCC Adjunct Faculty within the program/discipline
- PCC FT Faculty within the program/discipline
- PCC Faculty outside the program/discipline
- Program Advisory Board Members
- Non-PCC Faculty
- External Supervisors
- Other:

End of Planning Section – Complete the remainder of this report after your assessment project is complete.

Beginning of End-of-Year Reporting Section – complete the following sections after your assessment project is complete.

4. Changes to the Assessment Plan

Have there been changes to your project since you submitted the planning section of this report? **Yes** **No**

If so, summarize those changes below:

The Chemistry SAC's original plan was to use an existing assessment tool as part of the final exam for fall term CH151 classes; the assessment tool would then be rewritten for winter term CH151 finals. Nothing changed with our fall term assessment. During winter term, however, with most faculty behind schedule due to the disruptions caused by the snow closures. The Chemistry SAC did not have time to rewrite the assessment tool. No assessment was performed as part of winter term CH151 finals.

5. Narrative

Broadly, what did your SAC learn this year from the assessment of the selected core outcome?

The purpose of reassessing CH151 was to see if writing narrowly defined learning objectives for the class and then circulating these learning objectives to all faculty would improve course instruction. This year, 83% of students achieved the benchmark of 70% or better on the assessment compared to 81% last year. At first glance, this would indicate an improvement in instruction. An Anova test for significance was performed on the two data sets (Appendix, Figure 1). Unfortunately, this test for significance showed no significant statistical difference between the 2015-16 assessment data and the 2016-17 assessment data.

Besides collecting grades on the assessment tool, the Chemistry SAC also collected the final grades in CH221 during winter term for students that had taken CH151 the previous term. More students than the SAC expected took the assessment fall term but did not enroll in CH221 winter term (Appendix, Figure 2). For example, of those students who received a 90% or better on the assessment, 28.8% did not continue on to CH221 the next term. The number of students not continuing to CH221 increased to 51.7% for students receiving a C on the assessment. The worse students did on the assessment, the less likely they were to continue on to CH22. Since CH151 is taught primarily as a preparatory class for CH221, this large number of students not continuing the series was unexpected.

6. Results of the Analysis of Assessment Project Data

6A. Quantitative Summary of Sample/Population

How many students were enrolled in all sections of the course(s) you assessed this year? 422

If you did not assess in a course, report the number of students that are in the group you intend to generalize your results to.

How many students did you actually assess in this project? 273

Did you use a recommended sample size (see the Sample Size Calculator linked to in section 2J)? Yes

No

If you did not use a recommended sample size in your assessment, briefly explain why:

6B. Did your project utilize a rubric for scoring? Yes No

If 'No', proceed to section C. If 'Yes', complete the following:

How was inter-rater reliability assured? (Contact your SAC's LAC Coach if you would like help with this.)

- Agreement** – the percentage of raters giving each artifact the same/similar score in a norming session
- Consensus** - all raters score all artifacts and reach agreement on each score
- Consistency** – raters' scores are correlated: this captures relative standing of the performance ratings - but not precise agreement
- Inter-rater reliability was not assured.**

If you utilized agreement or consistency measures of inter-rater reliability, report the level here:

6C. Brief Summary of Benchmark Achievement (frequencies and/or averages)

1. If you used frequencies of benchmark achievement, report those here. For example, "46 students attained or exceeded the benchmark level in written communication and 15 did not." If necessary, provide detailed results in an appendix.
2. If you used percentages of the total to identify the degree of benchmark attainment in this project, report those here. For example, "75% of 61 students attained or exceeded the benchmark level over-all in written communication."

83% of students attained or exceeded the benchmark level of 70% or higher on the professional competency assessment tool that was given as part of the final exam in Fall term CH151 classes. We conclude that a majority of CH151 students have developed chemical concepts, math skills, and problem solving skills essential for successful completion of future studies in chemistry and other science courses.

3. Compare your students' attainment of your expectations/benchmarks in this reassessment with their attainment in the initial assessment. Briefly summarize your conclusions.

In the original assessment, 81% of students achieved the benchmark of 70%. The percentage of students meeting or surpassing the benchmark therefore increased by 3%. Closer statistical analysis of the results, however showed no significant statistical difference between the data sets.

6D. If possible, attach a more detailed description or analysis of your results (e.g., rubric scores, trend analyses, etc.) as an appendix to this document. Appendix attached? Yes No

6E. Do the results of this project suggest that additional academic changes might be beneficial to your students (changes in curriculum, content, materials, instruction, pedagogy etc.)? Yes No

If you answered 'Yes,' briefly describe the changes to improve student learning below. If you answered 'No', detail why no changes are called for.

The lack of statistical difference between the data sets indicates that more improvements in instruction can be made. It is possible that all the changes necessitated by the new learning objectives were not fully implemented in all CH151 sections. The Chemistry SAC will continue to stress the importance of our new learning objectives.

The data also suggests that the assessment tool itself should be revised. Correlation between performance on the assessment and final grade in CH151 has an R-squared value of 0.55 (Appendix, Figure 3). Since an R-squared value of 1 indicates perfect correlation and an R-squared value of 0 indicates no correlation, there is plenty of room for improvement. When achievement on the assessment tool is compared to final grade in CH221 with all the data removed from students who did not go onto CH221 (Appendix, Figure 4) it becomes more evident that the assessment tool is a poor indicator of future success in CH221. For example, students who received a A on the assessment had equal probabilities of earning an A or a B in CH221. In a better assessment tool, students who received an A on the assessment would tend to then receive an A in the subsequent class.

The data collected by the Chemistry SAC gives evidence of how the assessment tool can be improved. Since final grades in CH151 were collected as part of the assessment, the relationship between final grade in CH151 and final grade in CH221 could be investigated (Appendix, Figure 5). Final grade in CH151 was a better predictor of final grade in CH221 than the assessment score was. Closer alignment of the questions on the assessment with the CH151 learning objectives might yield an improved assessment tool.

If you are planning changes, when will these changes be fully implemented?

We hope to revise the assessment tool during the 2017-18 academic year.

6F. Has all identifying information been removed from your documents? (Information includes student/instructor/supervisor names/identification numbers, names of external placement sites, etc.)

Yes No

7. SAC Response to the Assessment Project Results

7A. Assessment Tools & Processes: Indicate how well each of the following worked for your assessment:

Tools (rubrics, test items, questionnaires, etc.):

very well some small problems/limitations to fix notable problems/limitations to fix completely inadequate/failure

Please comment briefly on any changes to assessment tools that would lead to more meaningful results if this assessment were to be repeated (or adapted to another outcome).

As discussed above, the assessment tool should be revised to give better alignment with our new learning objectives.

Processes (faculty involvement, sampling, norming, inter-rater reliability, etc.):

very well some small problems/limitations to fix notable problems/limitations to fix tools completely inadequate/failure

Please comment briefly on any changes to assessment process that would lead to more meaningful results if this assessment were to be repeated (or adapted to another outcome).

Some CH151 sections were not able to give the assessment as planned due to snow closures during finals week in Fall term. Also, some instructors did not record their data properly. The assessment required instructors record grades on the assessment, final letter grade in class, final percentage in class, and student G-number. This level of complexity confused some instructors and led to some data being unusable for the assessment due to its incompleteness.

8. Follow-Up Plan

8A. How will the changes detailed in this report be shared with all FT/PT faculty in your SAC? (select all that apply)

- | | | |
|--|--|-----------------------------------|
| <input checked="" type="checkbox"/> email | <input type="checkbox"/> phone call | <input type="checkbox"/> workshop |
| <input type="checkbox"/> campus mail | <input checked="" type="checkbox"/> face-to-face meeting | <input type="checkbox"/> other |
| <input type="checkbox"/> no changes to share | | |

If 'other,' please describe briefly below.

The data from this assessment was shared as a presentation in the Chemistry SAC's spring meeting. This final report will also be shared with the SAC by email.

8B. Is further collaboration/training required to properly implement the identified changes? Yes No

If 'Yes,' briefly detail your plan/schedule below.

Rewriting the assessment tool will necessitate collaboration between part time and full time faculty at all four campuses.

8C. Sometimes reassessment projects call for additional reassessments. These can be formal or informal. How will you assess the effectiveness of the changes you plan to make?

- | | |
|---|---|
| <input type="checkbox"/> follow-up project in next year's annual report | <input type="checkbox"/> on-going informal assessment |
| <input checked="" type="checkbox"/> in a future assessment project | <input type="checkbox"/> other |

If 'other,' please describe briefly below.

The rewritten assessment tool will need to be tested and the results compared to the data collected this year.

8D. SACs are learning how to create and manage meaningful assessments in their courses. This development may require SAC discussion to support the assessment process (e.g., awareness, buy-in, communication, etc.). Please briefly describe any successful developments within your SAC that support the quality assessment of student learning. If challenges remain, these can also be shared.

Members of the Chemistry SAC have "specialized" in assessment by taking the assessment course and by participating in the summer grading of assessment reports. These faculty member have proved particularly helpful in critiquing assessment reports

before they are submitted and helping the SAC to design assessments. The Chemistry SAC has also been mindful to make use of the assigned assessment coach to guide assessment design and the writing of reports.

Challenges to successful assessment include the conflict between academic freedom of faculty to dictate the content of their final exams and the need for conformity to accomplish an assessment of this design. There is obviously no easy answer to this conflict. A second challenge was that the complexity of the data that had to be recorded meant that some faculty members failed to record everything they needed to.