Annual Report for Assessment of Outcomes 2011-2012

Please address the questions below
send to *learningassessment@pcc.edu* by **June 22, 2012;** with Annual Report in the subject line

Note: Information provided in this report may be inserted into or summarized in Section 2C (LDC/DE)) or 6B (CTE) of the Program Review Outline.

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in 2010-2011. These may include but are not limited to changes to content, materials, instruction, pedagogy etc.
   The current academic year, 2011-2012 is the first year of assessment tool usage in the BCT department.

For each outcome assessed this year:

2. Describe the assessment design (tool and processes) used. Include relevant information about:
   - The nature of the assessment (e.g., written work, project, portfolio, exam, survey, performance etc.) and if it is direct (assesses evidence mastery of outcomes) or indirect (student's perception of mastery). Please give rationale for indirect assessments (direct assessments are preferable).
   - The student sample assessed (including sample size relative to the targeted student population for the assessment activity) process and rationale for selection of the student sample. Why was this group of students and/or courses chosen?
   - Any rubrics, checklists, surveys or other tools that were used to evaluate the student work. (Please include with your report). Where appropriate, identify benchmarks.
   - How you analyzed results, including steps taken to ensure that results are reliable (consistent from one evaluator to another.

The AAS Building Construction Technology degree currently has 6 outcomes. These outcomes are:

1. Safely construct and finish concrete foundations and flatwork systems by interpreting construction documents, estimating costs, and completing projects to code.
2. Safely construct various residential floor, wall, and roof framing systems by interpreting construction documents, estimating costs, and completing projects to code.
3. Safely construct various residential interior and exterior wall and roof coverings, millwork, cabinetry, and finishes by interpreting construction documents, estimating costs, and completing projects to code.
4. Apply competence in tool and job site safety, applied mathematics, estimating, building codes, and construction surveying. Use mathematics and estimating skills to effectively estimate material quantities and labor costs for a residential structure.
5. Practice the efficient use of natural and man-made resources in residential building construction.
6. Read, understand, and generate construction documents, and communicate in the construction environment using effective written and oral communication.

In the tool development stage of the assessment process, it became clear to faculty that these outcomes are overly broad, overreaching in the expectations placed upon students, and difficult or problematic to measure effectively. We chose to work on the development of tools which we as faculty believed were effective and important, and to revisit the outcomes once the tools were identified for the task.

We identified the following tools, and developed them toward the outcomes listed above. We then revisited the outcomes, and will propose to the college that the outcomes be revised to the following:

The AAS BCT Hands-On degree will modify our 6 outcomes, based upon our work on appropriate assessment tools. These **proposed** outcomes, **with assessment tools utilized**, are:

1. Interpret construction documents to build concrete foundation and flatwork systems to Oregon code standards.

   Direct Assessment tool 1: Instructor completes sheet documenting accuracy of each completed foundation (competency) in BCT 127.

   Direct Assessment tool 2: Instructor Observation of student's lab work performance, based on the following criteria:

   - Students work collaboratively in small group settings.
   - Students are evaluated based on actively participating and quality workmanship.
   - Students are not marked down because of a slow work tempo or any workmanship errors, providing student willingly makes corrections.

2. Interpret construction documents to build residential floor, wall and roof framing systems to Oregon code standards

   Direct Assessment tool 1: Instructor completes sheet documenting accuracy of floor, wall, and roof systems (competency) in BCT 120, 121, 122, and 123

   Direct Assessment tool 2: Instructor Observation of student's lab work performance, based on the following criteria:

   - Students work collaboratively in small group settings.
   - Students are evaluated based on actively participating and quality workmanship.
   - Students are not marked down because of a slow work tempo or any workmanship errors, providing student willingly makes corrections.

3. Interpret construction documents to build various residential interior and exterior wall and roof coverings, millwork, cabinetry and finishes to Oregon code standards

   Direct Assessment tool 1: Instructor completes sheet documenting accuracy of interior and exterior wall and roof coverings, millwork, cabinetry and finishes (competency) in BCT 128, BCT 203, and BCT 219.

   Direct Assessment tool 2: Instructor Observation of student's lab work performance, based on the following criteria:

   - Students work collaboratively in small group settings.
   - Students are evaluated based on actively participating and quality workmanship.
   - Students are not marked down because of a slow work tempo or any workmanship errors, providing student willingly makes corrections.

4. Use mathematic and estimating skills to effectively estimate material quantities and labor costs for a residential structure.

   Direct Assessment tools: Portfolio final exam project in BCT 204B: students estimate a residential structure and instructor compares student results with instructor results.

5. Practice the efficient use of natural and man-made resources in residential building construction.

   Direct Assessment tool: Embedded question in BCT 206; “Wood and steel are both used as structural materials in residential and commercial construction. Compare and contrast the proper

uses and typical application of these natural and man-made materials. Consider wall assembly, embodied energy, air sealing and leakage, thermal bridging, and any other aspects you care to add."

6. Read, understand and generate construction documents, and communicate in the construction environment using effective written and oral communication skills.

Direct Assessment tool: Portfolio project in ARCH 110; Students read and interpret information to generate construction drawings for a small house.

The student samples assessed were entire classes. The courses chosen were selected because they are required courses for the BCT Hands-on AAS degree, and because, in all cases, the courses are providing summative learning experiences rather than formative experiences. The learning outcomes we are assessing are broad and interrelated, and the assessment tools developed for each of these courses require students to apply knowledge and skills from other formative classes, in addition to the content from the course in question, to produce the highest level of work. Students who are 'drop in' students, and not degree seeking, were also assessed.

Results were reviewed by the faculty member who taught the course.

3. Provide information about the results (i.e., what did you learn about how well students are meeting the outcomes)?
   - If scored (e.g., if a rubric or other scaled tool is used), please report the data, and relate to any appropriate benchmarks.
   - Results should be broken down in a way that is meaningful and useful for making improvements to teaching/learning. Please show those specific results.

4. Identify any changes that should, as a result of this assessment, be implemented to help improve students' attainment of outcomes. (These may include, but are not limited to, changes in curriculum, content, materials, instruction, pedagogy etc).

5. Reflect on the effectiveness of this assessment tool and assessment process. Please describe any changes to assessment methodology that would lead to more meaningful results if this assessment were to be repeated (or adapted to another outcome). Is there a different kind of assessment tool or process that the SAC would like to use for this outcome in the future? If the assessment tool and processes does not need to be revised, please indicate this.

1. *Interpret construction documents to build concrete foundation and flatwork systems to Oregon code standards.*

Direct Assessment tool 1: Instructor completes sheets documenting the accuracy of each foundation (competency) in BCT 127

Direct Assessment tool 2: ***Instructor Observation*** *of student's lab work performance according to the following criteria:*

- *Students work collaboratively in small group settings.*
- *Students are evaluated based on actively participating and quality workmanship.*

- *Students are not marked down because of a slow work tempo or any workmanship errors, providing student willingly makes corrections.*

Results: Students work in teams of four to eight students (depending on class size) to form and pour concrete foundations. After the foundations were completed, the instructor checked the foundations for the following:

A. accuracy in measurements
B. that the foundation is square (within 1/8")
C. that the surface is smooth or not full of "bug holes"
D. that anchor bolts are where they should be
E. that beam pockets are where they should be
F. That foundation vents are where they should be

Students in each group were given a score from 1 to 4 according to the following guidelines:

4—Strong: Exhibits a sound knowledge about forming and pouring concrete foundations.
3—Acceptable: Exhibits average knowledge about forming and pouring concrete foundations.
2—Weak: Exhibits very limited knowledge about forming and pouring concrete foundations.
1—Unacceptable: Exhibits no knowledge about forming and pouring concrete foundations.

Scores were entered into the following Rubric:

Student	Accuracy	Square	Smooth	Anchor Bolts	Beam Pockets	Vents	Totals
1	3	4	3	4	1	4	19
2	4	4	3	3	3	4	21
3	2	3	3	3	3	4	18
4	3	4	3	4	1	4	19
5	3	4	3	4	1	4	19
6	4	4	3	3	3	4	21
7	2	3	3	3	3	4	18
8	2	3	3	3	3	4	18
9	4	4	3	3	3	4	21
10	2	3	3	3	3	4	18
11	3	4	3	4	1	4	19
12	4	4	3	3	3	4	21

As you can see, results were mixed (note that there were three groups, with four students in each group, so each student in each group has the same scores). All of the groups could have done better vibrating the concrete so the surface was smoother. One group put a beam pocket in the wrong place, and another group did not get the foundation as level as it should have been.

Changes: In the future, the instructor will make sure students check measurements, etc., more carefully before they pour concrete, and will focus more attention on consolidating the concrete so the surface is better.

Information supplied by BCT full-time instructor Kirk Garrison

2. *Effectively Interpret construction documents to build residential floor, wall and roof framing systems to Oregon code standards*

   Direct Assessment tool: Instructor completes sheet documenting accuracy of floor, wall, and roof systems (competency) in BCT 120, 121, 122, and 123

   This Assessment not completed for this school year

3. *Interpret construction documents to build various residential interior and exterior wall and roof coverings, millwork, cabinetry and finishes to Oregon code standards*

   Direct Assessment tool: Instructor completes sheet documenting accuracy of interior and exterior wall and roof coverings, millwork, cabinetry and finishes (competency) in BCT 128, BCT 203, and BCT 219

Results from BCT 128:

Critical Thinking and Problem Solving Lab Assignment:

Students were assessed according to their performance level in meeting the following goals:

- (A) Students are to work safely, measuring accurately, cutting and installing a lap siding to building code standards.
- (B) Includes installing lap siding level with the correct lap exposure.
- (C) Includes the installation of weather resistant paper to code standards.
- (D) Includes window installation, flashed to meet mid-term 2009 code standards.
- (E) Includes installation of, inside 90°, outside 90° and outside 45° wall corner boards.
- (F) Includes accurately measuring, marking and cutting siding to fit plant-on obstacles containing arcs and angles.
- (G) Includes effectively communicating with group members to achieve project goals.

Assessment Methods

Instructor Observation of student's lab work performance.

- Students work collaboratively in small group settings.
- Students are evaluated based on actively participating and quality workmanship.
- Students are not marked down because of a slow work tempo or any workmanship errors, providing student willingly makes corrections.

Rubric Scoring

(4) Strong: Exhibits a sound knowledge of codes, siding materials, methods and demonstrates accurate installation skills.
(3) Acceptable: Exhibits average knowledge of codes, siding materials, methods, with occasional installation errors.
(2) Unacceptable: Exhibits very limited knowledge of codes, siding materials, methods, with frequent installation errors.
(1) Weak: Exhibits no visible knowledge of codes, siding materials, methods and very weak installation skills.

Results Rubric Scoring

Student	(A)	(B)	(C)	(D)	(E)	(F)	(G)	Total	Comments
1	3	4	4	4	3	3	4	25	
2	4	4	4	4	3	4	4	27	
3	3	3	4	3	3	3	3	22	
4	4	4	4	4	4	4	4	28	
5	3	2	3	4	3	3	3	21	
6	4	4	4	4	4	4	4	28	
7	4	4	4	4	4	4	4	28	
8	4	4	4	4	4	4	4	28	
9	3	3	4	4	4	3	4	25	
10	3	3	4	4	4	3	4	25	
11	3	3	4	4	4	3	3	24	
12	4	4	4	4	4	4	4	28	
13	3	4	4	4	4	3	3	25	
14	4	4	4	4	4	4	3	27	
15	3	3	4	4	4	3	3	24	
16	4	4	4	4	4	3	3	26	

Student assessment is based on subject knowledge and workmanship for each of the assigned lab projects. Points are awarded based on the above rubric scoring that best describes their lab work performance.

Annual Report Summary

Each student's carpentry skills, workmanship quality, and knowledge of proper application techniques were observed during the lab exercises.

- Student average rubric score = 3.67.
- The average score is exceptionally high which reflects the fact there was a high percentage of motivated students.
- Many of this terms students also brought with them previously developed construction skills.
- The results indicated there were no lab assignment areas where course modifications were needed to help improve the student's attainment of program outcomes.
- I attribute this to that fact that I have been teaching this same BCT hands-on course for over eight years.
- Assessing student comprehension based upon course subject lecture exams and lab assignment performance results has been done each year I instructed this course.
- From the first classes instructed many changes have been implemented in both the lecture and lab portions of my classes.
- Each year lecture presentations are upgraded or modified to reflect new materials, current trends or code changes.
- Lab exercise assignments are also modified to address new subject matter presented in the lectures.

Results from BCT 203:

This assessment measures the student's ability to accurately measure cut and install interior finish trims. Each student assembles a 24' x 30" project board with 4" tall walls. The walls are arranged to provide corners that typically appear in residential homes. This assessment evaluates the student's first moulding application of a 2 1/4" colonial baseboard.

Critical Thinking and Problem Solving Lab Assignment:

Students are assessed according to their performance level in meeting the following goals:

- (A) Students are to work safely, measuring accurately, cutting and installing an inside copped corner
- (B) Includes installing an outside 90° miter joint.
- (C) Includes the installation of an outside 45° miter joint.
- (D) Includes the installation of miters to stop moulding mid-wall.
- (E) Includes installation of, outside 90° 3/4" round corners.
- (F) Includes installation of 30° and 45° mid-wall splices.
- (G) Includes effectively interpreting drawings to achieve project goals.

Assessment Methods

Instructor Observation of student's lab work performance.

- Student's choosing proper tool and degree saw settings.
- Student's placing mouldings in proper cutting position to make miter cuts.
- Student's measurement to achieving proper fit miters for quality workmanship.
- Students are not marked down because of a slow work tempo but are expected to achieve an accurate industry standard miter fit. Students are marked down for taking over two attempts or they are unwillingly to makes corrections.

Rubric Scoring

(4) Strong: Exhibits a sound knowledge of miter angles, finish materials, cutting methods and demonstrates accurate installation skills.

(3) Acceptable: Exhibits fair knowledge of miter angles, finish materials, cutting methods, with occasional installation errors.
(2) Unacceptable: Exhibits very limited knowledge of miter angles, finish materials, cutting methods with frequent installation errors.
(1) Weak: Exhibits no visible knowledge of miter angles, finish materials, cutting methods with very weak installation skills.

Results Rubric Scoring

Student	(A)	(B)	(C)	(D)	(E)	(F)	(G)	Total	Comments
1	4	3	3	4	3	4	3	24	
2	3	2	3	3	2	4	3	20	
3	4	4	4	4	3	4	4	27	
4	3	3	3	3	3	3	3	21	
5	4	4	3	4	3	4	4	26	
6	4	4	4	4	4	4	4	28	
7	3	3	3	3	3	3	3	21	
8	4	4	4	3	3	4	4	26	
9	4	3	3	3	3	3	4	23	
10	4	3	3	3	3	3	4	23	
11	4	4	4	4	4	4	4	28	
12	4	3	3	3	3	3	4	23	
13	4	3	3	3	2	2	4	21	
14	3	3	3	3	3	3	2	20	
15	4	3	3	3	3	3	4	23	

Student assessment is based on subject knowledge and workmanship for each of the assigned lab projects. Points are awarded based on the above rubric scoring that best describes their lab work performance.

Annual Report Summary

Each student's carpentry skills, workmanship quality, and knowledge of proper application techniques were observed during the lab exercises.

- Student average rubric score = 2.95
- The average score reflects that trim carpentry is fairly difficult and most students had to make multiple attempts. A high percentage of students motivated to achieve quality work.
- Many of this terms students also brought with them previously developed construction skills.
- The results indicated there were no lab assignment areas where course modifications were needed to help improve the student's attainment of program outcomes.
- I have been teaching this same BCT hands-on course for over eight years and have made many modifications over the years to enhance student learning.
- Assessing student comprehension based upon course subject lecture exams and lab assignment performance results has been done each year I instructed this course.
- From the first classes instructed many changes have been implemented in both the lecture and lab portions of my classes.
- Each year lecture presentations are upgraded or modified to reflect new materials, current trends or code changes.
- Lab exercise assignments are also modified to address new subject matter presented in the lectures.

Information supplied by BCT full-time instructor Robert Steele

4. *Use mathematic and estimating skills to effectively estimate material quantities and labor costs for a residential structure.*

   Direct Assessment tools: Portfolio final exam project in BCT 204B: students estimate a residential structure and instructor compares student results with instructor results.

   This Assessment not completed for this school year

5. *Recognize the appropriate use of natural and man-made resources in residential construction.*

   Direct Assessment tool: Embedded question in BCT 206; "Wood and steel are both used as structural materials in residential and commercial construction. Compare and contrast the proper uses and typical application of these natural and man-made materials. Consider wall assembly, embodied energy, air sealing and leakage, thermal bridging, and any other aspects you care to add."

Results: Student outcomes were fairly good. Most students described wood as a rapidly renewable resource, and that if the FSC label was selected for sourcing dimensional lumber, environmental impact

could be reduced. There was awareness that blocking & other short pieces of material should not be cut from full pieces of lumber. Additionally, they could describe the need to conserve lumber on the construction site by:

a) Developing detailed framing layouts

b) Optimizing building layout to correspond with standard material dimensions

c) Storing materials on a level surface under cover

Students could also identify that best practices would not include cutting required blocking & other short pieces at the job site using full pieces of lumber.

2/3 of my class were able to identify most, or all, of the following attributes of TJI's:

a) Engineered wood products can significantly reduce sawn lumber use, and therefore conserve resources

b) Permit twice the insulation capacity, due to the depth of the web, and therefore increase energy performance of the structure

c) Reduced cost due to less dimensional lumber required

d) Increase overall strength

e) Create truer, straighter surfaces

f) Lighter to handle & easier on construction crews

Regarding the use of steel, most students recognized that steel is highly recyclable, as well as itself likely recycled content. However, there is a higher embedded energy content to steel, and it is more problematic concerning energy performance due to increased thermal bridging. Both material choices were identified to have similar challenges/opportunities when designing for disassembly, and that durability is possible with both, albeit with vulnerability to moisture damage that can compromise strength.

Changes: The exam design for this assessment was by selection & matchup, rather than discussion. As such, students demonstrated abilities to recognize, identify, and select appropriate choices. To assess for higher levels of learning outcome -- abilities to generalize, summarize, distinguish and differentiate -- test questions would need to be modified.

Reflection: I have formative assessment throughout this course, in the form of ungraded quizzes either handed out, or uploaded to D2L. These have helped students track their own learning from the course, as well as guide them to the themes & fundamentals that they will see in the two summative exams for this course. I am pleased with the results of those tools. But, using a different assessment design than that described above, would likely demonstrate competence & learning outcomes to higher cognitive levels. I will explore other test questions for future classes -- both as formative quizzes, and summative exams.

Information provided by Part-time Instructor Paul Sammons

6. *Demonstrate basic ability to read, interpret and generate construction documents. Demonstrate oral communication skills necessary in the construction environment.*

   Direct Assessment tools: Portfolio project in ARCH 110; Students read and interpret information to generate construction drawings for a small house.

Results: Results of this assessment tool were very good. All students demonstrated the ability to meet the standard for the assignments. All students revise work after editing from the Instructor. The standard for this tool is reasonable for the students in the course. The students worked on in-class assignments to prepare for the assessment. The instructor made copies of each of the assignments and demonstrated what individual students could work on to improve, since all students begin and end at different levels based upon their incoming skills.

Changes: Changes to this assessment tool have not been identified. The Instructor recently modified the presentation of the material to better reflect the way the students learn the material, including a new project developed by the ARCH faculty, which is a better project than in years past.

Reflection: This is the appropriate tool for assessing this outcome. BCT will look at the assessment tools developed by the ARCH faculty for similar outcomes and adopt any tools that appear useful to the program and the students.

Information provided by Part-time Instructor Hilary Campbell