

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 Construction Management degree currently has 6 outcomes. These outcomes are:

1. Use research and memorization to demonstrate a basic understanding of residential and commercial construction codes, materials and methods.
2. Effectively apply mathematics, residential/commercial building codes; construction surveying, and basic engineering principles to the management of a construction project
3. Practice the efficient use of natural and man-made resources in both residential and commercial construction.
4. Effectively communicate in the construction environment by reading, interpreting and generating construction documents. Practice effective oral communication skills in the construction environment.
5. Manage a construction project by applying effective estimating, scheduling, job costing and business principles.
6. Identify safe construction practices and participate in the management of a hypothetical construction company's OSHA safety compliance program.

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 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 Construction Management degree will modify our 6 outcomes, based upon our work on appropriate assessment tools. These **proposed** outcomes, **with assessment tools utilized**, are:

1. Demonstrate a basic understanding of residential and commercial construction codes, materials and methods.
Direct Assessment tool: Embedded question in ARCH 133 requiring students to navigate the building code to solve a problem related to a materials compliance issue.
2. Effectively apply mathematics and basic engineering principles to solve problems encountered on construction projects.
Direct Assessment tool: Embedded question in BCT 222; Calculate the appropriate beam size for a simply supported beam
3. Recognize the appropriate use of natural and man-made resources in both residential and commercial 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.
4. 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. Portfolio project in BCT 222; Students prepare a written and oral presentation on a bridge design proposal for the Willamette River.
5. Demonstrate basic estimating, scheduling, job costing and business principles typically encountered on a construction project.
Direct Assessment tool: Portfolio project in BCT 225; Students prepare a Scope of Work, Letter of Intent, Schedule, and Estimate. Students work in groups of three to conduct peer review of projects.
6. Identify safe construction practices typically used in a construction company's OSHA safety compliance program.
Direct Assessment tool: Portfolio Project in BCT 130; Students prepare a Safety Plan for their hypothetical company and present it to the class.

The student samples assessed were entire classes. All courses were chosen because they are required courses for the BCT CM AAS degree. The courses were selected 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. A debriefing was held between the faculty member and the Construction Management Program Director and BCT Co-Chair, Shannon Baird.

A select sub-committee formed from members of the Industry Advisory Board will meet and review the results in an upcoming meeting.

Prepared by Full Time Instructor Shannon Baird

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. *Demonstrate a basic understanding of residential and commercial construction codes, materials and methods.*

Direct Assessment tool: Embedded question in ARCH 133 requiring students to navigate the building code to solve a problem related to a materials compliance issue.

Results: The final exam question that was used was the following:

"Can foam plastic trim, 9/16" thick and 8" wide, be used in more than 8% of the wall area where it is to be attached? If it can, what is the maximum flamespread index? If it cannot, what must change in order for the installation to meet the requirements? *Answer: No, the thickness of the foam plastic must be no thicker than 1/2, OSSC 806.3, 2604.2.2, 2604.2.3 & 2604.2.4.*

Four code sections, found in two different chapters needed to be addressed in order to arrive at the correct answer. This question required the student to do a little "digging".

55% (6) of the class got the question correct.

9% (1) of the class received partial credit for their answer.

27% (3) of the class navigated the code sections correctly, but failed to arrive at the correct answer.

9% (1) of the class did not provide an answer to the question.

Information Provided by Part-time Instructor Jim Sayers

2. *Effectively apply mathematics and basic engineering principles to solve problems encountered on construction projects.*

Direct Assessment tool: Embedded question in BCT 222; Calculate the appropriate beam size for a simply supported beam

Results: Results of this assessment tool were mixed. The standard for this tool is high for some of the students in the course. The students worked on in-class assignments and had homework problems to prepare for the

assessment. Due to the heavy workload in the class, and no math prerequisite requirement for the course, the Instructor opted to make the assessment tool an extra credit problem on the final exam rather than a credit problem. This resulted in a smaller sample size, which is problematic. Only half of the class chose to attempt the problem. Nearly all students who attempted the problem were able to perform the first basic functions, but only half of those who attempted were able to successfully size the beam, and check the results. Some students demonstrated that they 'could' solve the problem, but due to simple mathematical errors or mistakes in reading information on charts, were unable to complete the problem without error.

Changes: Changes to this assessment tool have been identified. The assessment tool must be mandatory. The Instructor must modify the presentation of the material to better reflect the way the students learn the material. The first improvement will be to further 'frame' the math problem as a 'building problem' and not a 'math problem'. The Instructor must improve delivery to reach the 'sceptical' student who is not confident they can do this 'kind' of math. The outcome and the assessment are demanding quite a lot from a 3 credit 'survey' type course. Some students suggested developing an introductory course and then an advanced course, which might have some merit, but it would also be adding additional credits to a degree that may not utilize the education at that level in private industry.

Reflection: This still appears to be the appropriate tool for assessing this outcome. The fact is it is a demanding outcome goal. The tool does not require revision, although as mentioned, it must be administered to every student in the class.

Information provided by Full time Instructor Shannon Baird

3. *Recognize the appropriate use of natural and man-made resources in both residential and commercial 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 an 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 -- my 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

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

Direct Assessment tools: Tool 1: Portfolio project in ARCH 110; Students read and interpret information to generate construction drawings for a small house. Tool 2: Portfolio project in BCT 222; Students prepare a written and oral presentation on a bridge design proposal for the Willamette River.

Tool 1 Assessment:

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

Tool 2 Assessment:

Results: Results of this assessment tool were very good. All students demonstrated the ability to meet the standard for the assignments. All students presented projects orally to the class, and fielded questions. The standard for this tool is reasonable for the students in the course. The students worked on the assignment outside of class to prepare for the assessment. The individual presentations allowed students an opportunity to learn from one another.

Changes: Changes to this assessment tool have not been identified.

Reflection: This is the appropriate tool for assessing this outcome. Students present in other BCT classes as well, but this type of presentation is similar to the types of presentations students may encounter in private industry.

Information provided by Full time Instructor Shannon Baird

5. *Demonstrate basic estimating, scheduling, job costing and business principles typically encountered on a construction project.*

Direct Assessment tool: Portfolio project in BCT 225; Students prepare a Scope of Work, Letter of Intent, Schedule, and Estimate. Students work in groups of three to conduct peer review of projects.

Results: Results of this assessment tool were good. All students demonstrated the ability to meet the standard for the assignments. Some students required a second attempt after editing from the Instructor and their peers in the group reviews. The standard for this tool is reasonable for the students in the course. The students worked on in-class assignments and had homework problems to prepare for the assessment. The group work was very beneficial. The instructor made copies of each of the assignments and posted three or four examples of the better work and the variety of approaches to each problem, which was useful for students to learn from one another.

Changes: Changes to this assessment tool have been identified. The Instructor must modify the presentation of the material to better reflect the way the students learn the material. The schedule portion and the estimating portion of the problem were less rigorous than similar projects that the students complete in the individual scheduling class and estimating classes. There may be a reason to change the assessment of those outcomes to those classes, but it is a nice summative project students work on in this class. The assignments can be very challenging for students who register for this class but have not taken the program. Those students struggled, so that leads to a possible idea of a prereq.

Reflection: This still appears to be the appropriate tool for assessing this outcome. As mentioned, we may want to assess in the other classes for scheduling and estimating, and we may want to examine a prereq for the class.

Information provided by Full time Instructor Shannon Baird

6. *Identify safe construction practices typically used in a construction company's OSHA safety compliance program.*

Direct Assessment tool: Portfolio Project in BCT 130; Students prepare a Safety Plan for their hypothetical company and present it to the class.

6. Direct assessment tool: Each student is required to author a safety policy (accident and illness prevention program) covering procedures and rules that apply to a company they plan to start or one where they are currently employed. The midterm is a Chemical Hazard Communications program covering ten chemicals/products used in their business along with the Material Safety Data Sheets for the products. The midterm is an

oral presentation of their program along with the knowledge gained from the MSDS. Students are usually surprised about the dangers associated from the products they use. The final is a complete safety policy covering general work rules for the various trades associated with their company. The midterm is blended into the final project.

Results: The students are provided with OR-O.S.H.A. laws, rules, program directives and publication by the instructor. The Oregon materials, the textbook and lectures provides all of the information needed to successfully complete the final project. Students are cautioned not to “goggle” information. The overall result has been very good as each student must research their safety needs and verbalize their company’s requirements to the class. The final exam was geared to making students comfortable with public students. Three of the students did general industry presentations that benefited everyone.

Changes: Some of the students have suggested that this class be taught in their first year so that they can be better prepared for the future.

Attached is a copy of the final exam sign in sheet. This sheet verifies the student’s participation in the final exam process / attendance and some

Helpful comments. Also attached are a couple of final presentations. You will notice that the O.S.H.A. codes are absent from the presentations in general. All students were cautioned about the dangers of trying to duplicate all of the codes in their policies but instead refer to them as needed.

Information provided by Part-time Instructor Bruce Poinsette