Course Assessment- Part B: Your Results & Analysis

COMPLETE #500

Please select your course and name from the drop-down menu. If your course or name are incorrect or missing, contact the Curriculum and Assessment Administrative Assistant, 541-506-6037 or swade@cgcc.edu.

MFG 155- Blueprint Reading- 1096837- Robert Clark- Spring 2021

* **Part B: Your Results DIRECTIONS 1. Report the outcome achievement data gathered via the assignments, tests, etc. you identified for each outcome (question 3) of your Part A. (Only include data for students who completed the course. Do not include students who withdrew or earned an incomplete) Data for all 3 outcomes should be reported below.**

Outcome #1:
This outcome will be assessed using an academic assessment that includes both written and hands-on portions. During the assessment students will identify weld symbols, annotate weld diagrams, read weld blueprints, create weld blueprints, and finally create a product using tooling in the lab to submit with the written assessment. The product will be measured for tolerance and weld print accuracy.

From pre-test data to final exam students showed marked improvement. Pre-test data from Miller Open-Book indicated that students had no previous knowledge of weld blueprints symbols with a class average of 43%, and because of this start from near zero understanding, gains throughout the term were a marked improvement. A later mid way quiz (not comprehensive, however) that was academic written in assessment only revealed an 85.5% class average. Students were able to average as a class an 75.25% on a normal bell curve on the comprehensive final assessment for the outcome. The test included a academic written exam having students both write, draw and interpret blueprints. Students also produced a product from blueprint in the test, and it was the strongest part of the students performance with a tolerance of 1/16" routinely met as well as correct weld placement and contour. Outcome #2:
Students will fabricate increasingly difficult products from blueprints over the course of the class. These products will be measured and toleranced, as well as checked for overall accuracy of the blueprint's interpretation. Finally, students will draw a blueprint themselves, and have them swapped at random with other students blueprints. Peers will assess each other's blueprints as well as instructor assessment.

From initial small blueprint fabrication students made big improvements in efficiency and design, as well as meeting increasing difficult tolerances, starting at 1/8" (.125") and ending at .025". Because of the increasing difficult of tolerance, grades data does not reflect improvements. As each assessment increases in complexity and rigor, however, students scores stayed relatively level with first assessment grade average being 86.13, second 89.5, third 94.5, fourth 90.63 and fifth 85.00. The fourth and fifth multi-part assemblies were peer reviewed or swapped with other students to increase difficulty. Grades tracked very well with difficulty increases. One students score was excluded from the fourth and fifth product as the student had to complete the course in an all digital manner so the assessment given was different and not a complimentary comparison.

Outcome #3:
Verify product use and application, check blue print tolerance and part fitment. Once the product design has been verified, students will cut the parts and check tolerances, and do finish welding on the product. Students will be assessed on how the product functions, if it meets tolerance, and if it solves the problem initially laid out in the design phase.

In both Multi-Part Assembly 1 and Multi-Part Assembly 2 all students met these outcomes, with largely successful results. As the grades are built in to one score it is difficult to use grading as useful metric of assessment as in the previous two outcomes. There was significant growth particularly in self-designed complexity and therefor rigor. Students produced a wide variety of product, from large commissioned signage for local businesses, to useful household items like a boot jack, and automotive parts like a center console for a truck. These products solved useful problems, and ultimately fit correctly and worked as designed in the initial design phase. Only one major multi-part assembly was a failure out of 16, and that was largely due to time constraints and extreme complexity of parts designed. This student, however, did make a make-up assembly / product that did meet specifications. Most students did complete all function, tolerance and problem solving protocols and requirements in their assemblies, however often times one part of the larger products were not to spec. This growth, particularly in rigor from what students attempted with the CNC in the first assembly to the second indicates a largely successful outcome. This part of the course did suffer the most from the COVID time crunch that has been felt over the course of the year. As all MFG courses carried the same cohort, and up until Spring Term were only 50% in person, hands on experience has been limited. This resulted in lower overall total quality mentioned above as many students were still learning and mastering skills that would normally have been completed in WLD195 and MFG150- but were forced to leak in to MFG155 as it was the first course that was nearly fully in person. This time-crunch was greatly mitigated by the increased use of moodle and digital resources, included video.

*** Outcome #1**

Identify basic and intermediate blueprint annotation and markings.

This outcome will be assessed using an academic assessment that includes both written and hands-on portions. During the assessment students will identify weld symbols, annotate weld diagrams, read weld blueprints, create weld blueprints, and finally create a product using tooling in the lab to submit with the written assessment. The product will be measured for tolerance and weld print accuracy.

*** % of students who successfully achieved the outcome (C or above)**

100

*** Outcome #2**

Produce to tolerance welding samples from blueprints.

Students will fabricate increasingly difficult products from blueprints over the course of the class. These products will be measured and toleranced, as well as checked for overall accuracy of the blueprint's interpretation. Finally, students will draw a blueprint themselves, and have them swapped at random with other students blueprints. Peers will assess each other's blueprints as well as instructor assessment.

*** % of students who successfully achieved the outcome (C or above)**

88

*** Outcome #3**

Produce parts designs from computer aided design (CAD) programs and utilize CAD designs to create sample parts.

Verify product use and application, check blue print tolerance and part fitment. Once the product design has been verified, students will cut the parts and check tolerances, and do finish welding on the product. Students will be assessed on how the product functions, if it meets tolerance, and if it solves the problem initially laid out in the design phase.

*** % of students who successfully achieved the outcome (C or above)**

100

*** ANALYSIS 3. What contributed to student success and/or lack of success?**

The biggest contributor as briefly mentioned above was the time crunch dribble down due to COVID protocol from the earlier terms. The lack of hands-on experience with equipment was largely mitigated through the use of technology and moodle via videos and open-source resources as well as increased lab access and time in Spring term, however, there is no substitute for students having equipment in their hands in technical training courses like these. Overall product quality was down, however, learning and technical knowledge was greatly accelerated. In the end, this will likely lead to much greater outcomes in later terms now that the technology piece has been more well developed, as it can be used congruently with in class lecture and directly give students even more hands on time with equipment than ever before while not losing the academic learning necessary in the courses.

*** 4. Helping students to realistically self-assess and reflect on their understanding and progress encourages students to take responsibility for their own learning. Please compare your students' perception of their end-of-term understanding/mastery of the three outcomes (found in student evaluations) to your assessment (above) of student achievement of the three outcomes.**

Unfortunately, students did not answer the survey in either enough of a timely manner or at all. We did have in class discussions about learning from beginning to end of term and cohort. Students were able to reflect on their

*** 5. Did student achievement of outcomes meet your expectations for successfully teaching to each outcome (question 4 from Part A)**

Yes.

*** 6. Based on your analysis in the questions above, what course adjustments are warranted (curricular, pedagogical, student instruction, etc.)?**

Further digital expansion of the curriculum to further fully realize the hy-flex model benefits, even after it is not necessary or required any longer.

7. What resources would be required to implement your recommended course adjustments (materials, training, equipment, etc.)? What Budget implications result?

Additional time for making videos for instructors would be helfpul, but there should be no necessary budget implications as most the necessary equipment and software is free to use or can be borrowed from the libraries media services.

*** 8. Describe the results of any adjustments you made from the last assessment of this course (if applicable) and their effectiveness in student achievement of outcomes.**

This is the first assessment of this course, I believe. Last year this assessment was cancelled as the course was fully digital and nearly impossible to meet all outcomes without having students using equipment at all- unfortunately I do not have a take-home CNC for students :). The biggest adjustment from the last "normal" teaching of this course is certainly the emphasis and expansion on digital resources to accelerate student technical learning, which in turn greatly accelerates their experiential / vocational learning.

9. Describe how you explain information about course outcomes and their relevance to your students.

These outcomes become very relevant to students because of their direct application. The outcomes solve real problems, sometimes one that students have put in front of them. The digital resources help students expand their understanding of the different problems that they can solve that they don't self identify, as well as their look at other students projects and blueprints.

10. Please describe any changes/additions to instruction, curriculum or assessment that you made to support students in better achieving the CGCC Institutional Learning Outcomes: ILO #1: Communication. The areas that faculty are focusing on are: "Source and Evidence" and "Organization and Presentation" and ILO #2: Critical Thinking/Problem Solving. The areas that faculty are focusing on are: "Student's Position" (Critical Thinking) and "Evaluate Potential Solutions" (Problem Solving). ILO #4: Cultural Awareness. The area that faculty is focusing on is: "Curiosity" - Encouraging our students to "Ask deeper questions about other cultures and seek out answers to these questions" ILO #5: Community and Environmental Responsibility. The area that faculty are focusing on are: "Applying Knowledge to Contemporary Contexts" and "Understanding Global Systems" ILO#3 -Quantitative Literacy - "Application/Analysis" and/or "Assumptions"

#1- Absolutely the use of moodle and digital videos were the largest change in any area. Often times using multiple sources to show the difference in the many styles, types and welding solutions that I may not have mastered yet, but are just as relevant and efficient as the techniques taught direct in class in lecture and in lab coaching.
#2- As listed above, direct problem solving and critical thinking are certainly the biggest components of this course in general, from identifying problems to finding solutions- this is the heart of creating a successful product; solving a consumer problem. Changes made to address this included creating a more rigorous environment for development while not removing necessary scaffolding through the use of increasingly tight tolerancing.
#4- This is a difficult ILO to include in this course, and was not addressed beyond through the lens of problem solving for product in different countries with problems differing from the US.
#5- This course does a good job already of addressing the understanding of "Global Systems" as US manufacturing rapidly adjusts to research, development and rapid prototyping. The outcomes in this course lay the groundwork for later learning on how these manufacturing worlds merge the new spectrum of manufacturing labor in the US. In the future, a change that will be made will be to make a digital unit on this manufacturing spectrum so that students better understand it; it has been currently only taught in lecture.
#3- This course relies on application and analysis based on the earlier assumption of need to create a product. At the core of what students in manufacturing do is finding applications and using quantitative analysis to solve the problem the application presents as they develop the solution in form of product. Not much adaption was necessary beyond making students more cognizant of the process and procedure.