

1. Year & Semester of assessment:

Spring 2017

2. Course assessed:

SCED 141

3. SLO assessed:

1.1: Students will be able to: demonstrate an understanding of the DCIs in Physical Science (PS), Life Science (LS), and Earth and Space Science (ESS)

2.1: Students will be able to: Use the science and engineering practices to answer question (science) and come up with solutions (engineering)

4. Assessment Methodology Used:

1.1:

Data collection - Students (N=62) completed a physical science concept inventory that the developers of the Next Gen PET curriculum are currently validating as a pre and post assessment. The assessment is composed of multiple choice questions, each with only one correct answer. The pretest was taken on scantrons during the first day of class. The posttest was taken on the last day of class. Prior to both administrations students were instructed that their performance on the assessment would not affect their grade, but that their performance would provide me feedback on what they knew so that I can improve the course.

Data analysis - Student tests were scored for correctness and each student was given a pre and posttest score. Cohen's *d* ($[\text{pre}\% - \text{post}\%] / \text{pooled S.D.}$) was calculated for the class to compare the class's pre and post test results. The course's *d* score will be used to determine how successful the course was in supporting student's learning of core physical science material. Cohen's cut-off values for small (0.2), medium (0.5), and large effect sizes (0.8) will be used to determine "below expectations", "meets expectations", and "exceeds expectations" performance.

2.1:

Data collection - Students (N=62) completed the Colorado Learning Attitudes about Science Survey (CLASS) as a pre and post assessment. The CLASS is a research-tested instrument designed to measure student beliefs about physics and about learning physics. Each CLASS item is a likert style question with 5 possible answers ranging from strongly disagree to strongly agree. The pretest was taken online outside of class time using the Learning About Supported Student Outcomes (LASSO) platform during the first week of class. The posttest was taken during the last

week of class. Prior to both administrations students were instructed that their performance on the assessment would not affect their grade, but that their performance would provide me feedback on what they knew so that I can improve the course.

Data analysis - Data was cleaned by removing students who didn't correctly answer the filter question and for students who did not complete both the pre and post assessments. The standard method will be used for analyzing the CLASS. Strongly disagree and moderately disagree answers will be collapsed into a single category. The same collapsing will occur for the agree statements. Each of these statements will then be scored based on how they align with experts answers to the questions. This will give each student a percentage of the questions that they answered the same as experts and opposite from experts. The shifts in these levels of agreement from the pre to the post test are analyzed to identify the course's effect on 8 independent constructs: (1) Personal interest, (2) Real world connection, (3) Problem solving general, (4) Problem solving confidence, (5) Problem solving sophistication, (6) Sense making/Effort, (7) Conceptual understanding, and (8) Applied conceptual understanding. Each of these individual categories will also be examined to get an overall score. The broader literature on CLASS scores show that the significant majority of college science classes create negative shifts in student results. The class will be judged as "below expectations" if it has positive shifts in 2 or fewer of the subcategories, "meets expectations" if it has positive shifts in 3-6 subcategories, and "exceeds expectations" if it has positive shifts in 7 or more subcategories.

5. Assessment Results:

Please describe outcomes of assessment. How well did students perform on the assessment task? Feel free to use the table below to report results, adapting the table as necessary, or provide narrative describing the assessment results.

Student Learning Outcome	Sample and Sample Size	Measure	Percent of Students Achieving
1.1 DCIs	Pre: 62 Post: 50	Pre-post shifts on NextGen PET assessment	Class effect size (d) = 0.17 (below expectations)
2.1 Practices	40 matched	Pre-post shifts on CLASS	Positive shifts were seen in all 8 categories (exceeds expectations)

6. Analysis / Interpretation of Results

1.1: The results show that students are largely not meeting my expectations for mastering content knowledge in the course. There is some concern that there may have been testing issues that led to some bad data due to irregularities associated with using an assessment that is still under development. The instructor of the course collected all the data and performed the analysis. The results were not specifically shared with the students in the course.

2.1: The results show me that the students are engaging in modeling scientific practices and being metacognitive about the process. The instructor of the course collected all the data and performed the analysis. The results were not specifically shared with the students in the course.

7. Planned Program Improvement Actions Resulting from Outcomes (if applicable)

While the class exceeded expectations in one area, it was below expectations in another. Because of this, extra attention will be paid to ensuring that the disciplinary content is given more attention while trying to maintain the course focus on helping students understand the nature of science.

8. Planned Revision of Measures or Metrics (if applicable)

The use of the CLASS and associated metrics seem appropriate going forward. The Next Gen PET assessment is under development and actively being updated, so as that instrument is refined, new versions will be used in the course. Also, the Next Gen PET assessment is also being given online now rather than on scantron.

9. Planned Revisions to Program Objectives or Learning Outcomes (if applicable)

N/A

II. Appendices (please include any of the following that are applicable to your program)

A. Assessment Data Summaries (Details that elaborate on item 5, above.)



Learning Assistant Alliance

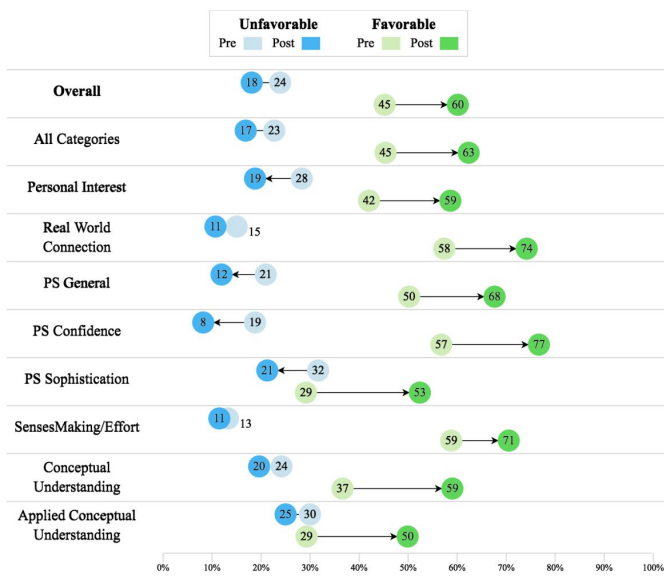
A project of the University of Colorado-Boulder LA Model

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LA Supported Student Outcomes (LASSO) Study

Assessment: CLASS-PHYS N (matched) = 40
 Institution: California State University, Chico
 Course: SCED 141 1
 Instructor: Ben Van Dusen
 Term: Spring 2017



Data for the analysis was cleaned by removing student assessments where less than 80% of the questions were answered and/or did not correctly answer the filter question (Q-31).

B. Measurement Standards (Rubrics, etc.)

C. Survey Instruments