

Program-Level Assessment: Annual Report

Program Name (no acronyms): Data Science Department: Mathematics & Statistics/CS
Degree or Certificate Level: Undergraduate College/School: Arts and Sciences
Date (Month/Year): September/2022 Assessment Contact: Darrin Speegle
In what year was the data upon which this report is based collected? AY 2021-2022
In what year was the program's assessment plan most recently reviewed/updated? AY 2019-2020
Is this program accredited by an external program/disciplinary/specialized accrediting organization? No

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

Outcome 1: Graduates will use programming and other computer science skills to analyze and interact with data.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe the artifacts in detail and identify the course(s) in which they were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

Students in DATA 1800 and DATA 2800 were split into three groups according to experience within the data science program. Freshmen were in one group, sophomores in a second group, and juniors and seniors in a third group. The students were given a piece of a larger data set and told to provide an interval estimation of the standard deviation of the data that they did not see. The artifacts collected were the students' code (or other explanation of how the estimate was made) and the estimate itself.

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and **include them in/with this report document** (please do not just refer to the assessment plan).

The rubric used to assess the artifact is given below:

- 0: Student shows little or no understanding of the concept(s)
- 1: Student shows a limited understanding of the concept(s)
- 2: Student shows competence, but not complete mastery of the concept(s)
- 3: Student shows mastery of the relevant concept(s)

The artifact was assessed by the course instructor and another instructor independently.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

The result of the assessment is that the group of juniors and seniors scored a 3, the group of sophomores scored a 1, and the group of freshmen scored a 0. Subjectively, the difference in artifacts was substantial.

1. The freshman group had no work to show, and merely handed in an interval of numbers that showed that they had an idea what standard deviation is, but no real idea as to how to use programming techniques to do the problem.
2. The sophomore group was able to write a program that computed an interval based on standard deviations, but it showed a substantial misunderstanding of the problem.
3. The senior group provided a program which correctly computed an interval using good programming practices and appropriate techniques for the problem.

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

This assessment provides evidence that our graduates are not coming to campus with Learning Objective 1 already mastered, but they are mastering it through their time at SLU.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

The results were shared at a department meeting on September 21. An oral presentation of the findings was provided to the department, and discussion ensued.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies

- Course content
- Teaching techniques
- Improvements in technology
- Prerequisites

- Course sequence
- New courses
- Deletion of courses
- Changes in frequency or scheduling of course offerings

Changes to the Assessment Plan

- Student learning outcomes
- Artifacts of student learning
- Evaluation process

- Evaluation tools (e.g., rubrics)
- Data collection methods
- Frequency of data collection

Please describe the actions you are taking as a result of these findings.

If no changes are being made, please explain why.

The assessment indicates that students are progressing from freshman to senior year in an appropriate manner in order to achieve mastery in learning objective 1.

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

The program has removed the requirement of CSCI 2300 for the data science degree, and replaced it with an elective course.

B. How has this change/have these changes been assessed?

The change only occurred recently, so we do not have any assessment of the change. However, we can compare the results of this year's assessment to a cohort which has not been required to take CSCI 2300 in the future in order to determine whether the lack of CSCI 2300 has led to a deterioration in the mastery of Learning Objective 1.

C. What were the findings of the assessment?

Our findings are that students are currently mastering learning objective 1, and we will assess that again in order to make sure that students are still mastering it after the change.

D. How do you plan to (continue to) use this information moving forward?

We will compare results from this assessment to future assessments in order to make sure that students are still mastering learning objective 1.

IMPORTANT: Please submit any assessment tools (e.g., artifact prompts, rubrics) with this report as separate attachments or copied and pasted into this Word document. Please do not just refer to the assessment plan; the report should serve as a stand-alone document.