UNIVERSITY OF SAN FRANCISCO | College of Arts and Sciences

Science, Technology, Engineering and Math Education Minor

ASSESSMENT REPORT
ACADEMIC YEAR 2019 – 2020
REPORT DUE DATE: 12/4/2020

- Who should submit the report? – All majors, minors (including interdisciplinary minors), as well as graduate and non-degree granting certificate programs of the College of Arts and Sciences.
- Programs can combine assessment reports for a major and a minor program into one aggregate report as long as the mission statements, program learning outcome(s) evaluated, methodology applied to each, and the results are clearly delineated in separate sections.
- Undergraduate, graduate and certificate programs must submit separate reports
- It is recommended that each assessment report not exceed 10 pages. Additional materials (optional) can be added as appendices.
- A curricular map should be should be submitted along with each assessment report (we suggest that the curricular map should be informed by recent assessment outcomes).

Some useful contacts:

1. Prof. Alexandra Amati, FDCD, Arts – adamati@usfca.edu
2. Prof. John Lendvay, FDCD, Sciences – lendvay@usfca.edu
3. Prof. Mark Meritt, FDCD, Humanities – meritt@usfca.edu
4. Prof. Michael Jonas, FDCD, Social Sciences – mrjonas@usfca.edu
5. Prof. Suparna Chakraborty, AD Academic Effectiveness – schakraborty2@usfca.edu

Academic Effectiveness Annual Assessment Resource Page:

https://myusf.usfca.edu/arts-sciences/faculty-resources/academic-effectiveness/assessment

Email to submit the report: assessment_cas@usfca.edu

Important: Please write the name of your program or department in the subject line.

For example: FineArts_Major (if you decide to submit a separate report for major and minor); FineArts_Aggregate (when submitting an aggregate report)

I. LOGISTICS

1. **Please indicate the name and email of the program contact person to whom feedback should be sent (usually Chair, Program Director, or Faculty Assessment Coordinator).**

Michael Rozendal, UTEC Academic Director, marozendal@usfca.edu &
Mary Coen, UTEC Director, mlcoen@usfca.edu

2. **Please indicate if you are submitting report for (a) a Major, (b) a Minor, (c) a Major and Minor aggregated report (in which case, each should be explained in a separate paragraph as in this template), (d) a Graduate or (e) a Certificate Program**

Minor program

3. **Please note that a Curricular Map should accompany every assessment report. Have there been any revisions to the Curricular Map?**

No revisions. Map included in supporting documents.

II. MISSION STATEMENT & PROGRAM LEARNING OUTCOMES

1. **Were any changes made to the program mission statement since the last assessment cycle in October 2018? Kindly state "Yes" or "No." Please provide the current mission statement below. If you are submitting an aggregate report, please provide the current mission statements of both the major and the minor programs**

Mission Statement (Minor):

Yes we made a minor change to the mission statement. As follows:

The STEM Education minor ~~is designed to~~ trains students to become enthusiastic, well-grounded teachers who will inspire students and advocate for STEM education in classrooms and communities. The minor includes a range of science and mathematics courses and a concentration in one particular subject.

2. **Were any changes made to the program learning outcomes (PLOs) since the last assessment cycle in October 2019? Kindly state "Yes" or "No." Please provide the current PLOs below. If you are submitting an aggregate report, please provide the current PLOs for both the major and the minor programs.**

   Note: It is expected that PLOs will vary in level of mastery between different programs in the same discipline (e. g., a major and minor in the same subject area). Major revisions in the program learning outcomes need to go through the College Curriculum Committee (contact: Professor Joshua Gamson, gamson@usfca.edu). Minor editorial changes are not required to go through the College Curriculum Committee.

PLOs (Minor):

No changes.

Students will:

1. Communicate a range of STEM disciplines to broad audiences
2. Demonstrate focused understanding of a single STEM discipline
3. Apply educational models, theories, and resources to teaching STEM disciplines
4. Articulate connections between STEM disciplines and social justice

3. **State the particular program learning outcome(s) you assessed for the academic year 2019-2020. What rubric did you use?**

   The Role of Rubrics

   The rubric is the single most important thing you need for assessment, and putting time and thinking into designing a good rubric is going to make the entire process a lot easier, faster, and meaningful. Your rubric should break down your chosen PLO into the smallest measurable components, so that the assessment of each piece of work becomes linear and easy, and the calibration among different faculty assessing more objective. If you still have to debate a while whether that one line of the rubric has been fulfilled or not, chances are your rubric item is still an aggregate and can be broken down further into smaller components. Once you have made a detailed rubric, then not only the "grading" work will be faster and straightforward, but at the end of it you will have data that is significantly more meaningful. For example, some parts of the PLO may be in tiptop shape while others may need to be massaged or tweaked, with more attention given to that particular item in class. Conversely, your data may show you that the PLO itself is not what you thought it should be—it may be that it duplicates something other PLOs include or that a crucial part of what you teach is getting lost in the cracks between your PLOs. So do make sure that the rubric is as detailed and thorough as you possibly can manage (a short rubric in fact makes the grading longer, as counterintuitive as that seems).

PLO(s) being assessed (Minor):

1. Communicate a range of STEM disciplines to broad audiences

Rubric and data can be found here: https://bit.ly/37rHzwP

III. METHODOLOGY

Describe the methodology that you used to assess the PLO(s). For example, "the department used questions that were inputted in the final examination pertaining directly to the <said PLO>. An independent group of faculty (not teaching the course) then evaluated the responses to the questions and gave the students a score for responses to those questions."

Important Note – WSCUC advises us to use "direct methods," which consist of a direct evaluation of a student work product. "Indirect methods" like exit interviews or student surveys can be used only as additional complements to a direct method.

For any program with fewer than 10 students: If you currently have fewer than 10 students in your program (rendering your statistical analysis biased due to too few data points), it is fine to describe a multi-year data collection strategy here. It would be important to remember that every 3 years, we would expect you to have enough data to conduct a meaningful analysis.

Important: ***Please attach, at the end of this report, a copy of the rubric used for assessment.***

Methodology used (Minor):

Student work products were assessed by program staff.

The products assessed were final papers that compared five science education organizations.

The rubric assessed four goals:

1. Identify a diverse number of organizations
2. Describe each organization's focuses in detail
3. Compare and contrast organizations
4. Clearly synthesize information for a broad audience

These goals embody some of the dynamics of the program learning outcome being assessed. Diverse organizations speak to the range of sciences and audiences that teachers will need to engage. Diving into the particular work of these organizations gives some sense of how this work might become part of classroom learning. Comparing and contrasting is an initial stage of analysis that fuels an outward looking, audience-centered synthesis.

IV. RESULTS & MAJOR FINDINGS

What are the major takeaways from your assessment exercise?

This section asks you to highlight the results of the exercise. Pertinent information here would include:

a. **how well students mastered the outcome at the level they were intended to,**
b. **any trends noticed over the past few assessment cycles, and**
c. **the levels at which students mastered the outcome based on the rubric used.**

Results (Minor):

All students achieved a "Good" or better for each of the assessed items. Students almost universally earned an Excellent for the first two items. There was some variation in students' ability to compare, contrast, and synthesize the information, but in general, the rubric scores indicate that students demonstrated a comprehensive understanding and met the learning outcome with this particular assignment.

V. CLOSING THE LOOP: ACTION PLAN BASED ON ASSESSMENT RESULTS

1. **Based on your analysis in Section 4, what are the next steps that you are planning in order to achieve the desired level of mastery in the assessed learning outcome? This section could also address more long-term planning that your department/program is considering and does not require any changes to be implemented in the next academic year itself.**

Closing the Loop (Minor):

Given that the results show a high level of mastery overall, significant changes to the course are probably not needed. All students met the requirements for the final project. Some students could strengthen their writing skills to better compare and synthesize topics, but overall students showed a strong understanding of the content and communicated it in such a way that would be accessible to a broad audience.

2. **What were the most important suggestions/feedback from the FDCD on your last assessment report (for academic year 2019-2020)? How did you incorporate or address the suggestion(s) in the more recent assessment discussed in this report?**

Suggestions (Minor):

Our last report assessed a different learning outcome. Like last year's report, this report did not show any major disparities in learning (or in mastering the outcome), but the relative complexity of last year's assessment was not possible to replicate given the change to online learning as a result of the coronavirus epidemic. Students were not able to complete the original hands-on research project (5 hours of observing and analyzing a science program that works with underserved communities), thereby limiting our ability to provide a deeper assessment of the final project.

VI. BIG PICTURE

What have you learned about your program from successive rounds of assessment? Is a picture of the whole program starting to emerge? For example, what areas of strength have emerged? What opportunities of improvement have you identified?

Big Picture (Minor):

The change to an online format mid-semester limited students' ability to complete the original final project. The revised final project could not involve hands-on learning, so students were instead asked to research and compare five science organizations. The relative simplicity of the assignment meant it was not possible to assess more complex learning.

Lessons learned:

1. Continue to assess major or final projects.
2. Whenever possible, have faculty who are teaching the class assess student work using a rubric of their own choice.
3. Pro-actively involving faculty early in the process, rather than retroactively looking for student assignments, benefited both the assessment process and students' learning outcomes.
4. One of our goals was to start the assessment project earlier in the year, allowing ample time over the summer for analysis. Meeting this goal this year allowed us to better analyze the data.

Opportunities include:

1. Incorporating feedback and suggestions from the instructor. While we were able to bring in the adjunct faculty earlier, our assessment would be strengthened by more direct input from the faculty member.

VII. Feedback to your Assessment Team

What suggestions do you have for your assessment team (the Faculty Directors of Curriculum Development and the Associate Dean for Academic Effectiveness)? What can we do to improve the process?

Nothing at this time.

ADDITIONAL MATERIALS

STEM Education Minor Curriculum Map 2019

	Courses	
Program Learning Outcomes	Teaching Life Sciences (INTD 320)	Exploring Physical Sciences (INTD 321)
1. Communicate a range of STEM disciplines to broad audiences	Intermediate Advanced	Intermediate Advanced
2. Demonstrate focused understanding of a single STEM discipline	Intermediate Advanced	Intermediate Advanced
3. Apply educational models, theories and resources to teaching STEM disciplines	Intermediate Advanced	Intermediate Advanced
4. Articulate connections between STEM disciplines and social justice	Intermediate Advanced	Intermediate Advanced

Rubric and Data

Rubric/Data can be found here: https://bit.ly/37rHzwP