

**Feedback for the 2012-2013 Annual Assessment Report
Department of Mathematics and Statistics**

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I. Summary Memo to the Deans/Chairs/Program Directors

To: Dean, College of Natural Sciences and Mathematics
Chair, Department of Mathematics and Statistics
From: Office of Academic Program Assessment (OAPA)
Date: December 2013
Subject: Feedback for the 2012-2013 Annual Assessment Report
CC: Office of Academic Affairs

The 2012-2013 annual assessment reports are based on *The 2012-2013 Annual Assessment Report Template* (see Appendix 1 for more details), and the Office of Academic Program Assessment (OAPA) has provided detailed feedback for each of the 64 submitted reports. *The Feedback for the 2012-2013 Annual Assessment Report* is summarized below.

| Section: | Details: |
|-------------|---|
| I | Summary Memo to Deans/Chairs/Program Directors |
| II | Detailed Feedback for the 2012-2013 Annual Assessment Report |
| III | General Recommendations |
| IV | Program Summary and Assessment Status |
| Appendix 1: | The 2012-2013 Annual Assessment Report Template |
| Appendix 2: | WASC “Rubric for Assessing the Quality of Academic Program Learning Outcomes” |
| Appendix 3: | Sacramento State Baccalaureate Learning Goals for the 21st Century & AAC&U’s 16 VALUE Rubrics |
| Appendix 4: | Important Considerations for Program Review and Assessment |
| Appendix 5: | Relevant Verbs in Defining Learning Outcomes |
| Appendix 6: | Background Information for Academic Program Assessment and Review |

We have used appropriate WASC (Western Associate of Schools and Colleges) rubrics for guidance on effective assessment practices in several areas, including the quality of learning outcomes (see Appendix 2 for an example), assessment plans, methods/data/analysis, program review, and the use of assessment data for curricular improvement, academic planning, and budgeting. These rubrics were provided in appendices in *The Feedback for the 2011-2012 Annual Assessment Report*, and will not be repeated here.

We hope the two feedback reports (*Feedback for the 2011-2012 Annual Assessment Report* and *Feedback for the 2012-2013 Annual Assessment Report*) will be used to help the academic unit (whether a department, a program, or a college) determine the extent to which its current assessment system is adequate and what additional components or processes may need to be developed or improved for **all the degree programs** in the academic unit.

Finally, we would like to thank Dr. Don Taylor (Interim Assistant Vice President, Academic Programs and Global Engagement), Janett Torset, and our student assistants (Anthony Leonardini and Huiyu Wen) for their assistance in this assessment review process.

If you have any questions or suggestions, please contact Dr. Amy Liu (amyliu@yaho.com), Director of the Office of Academic Program Assessment. Thank you.

II. Detailed Feedback for the 2012-2013 Annual Assessment Report

| Template Questions ¹ | Detailed Questions/Criteria and Comments | Simple Feedback ² |
|---------------------------------|--|------------------------------|
| Q1 | Q1.1. Has the program made any assessment and/or curriculum related changes as a result of the assessment in the 2011-2012 academic year? <i>Comments:</i> A new rubric for a PLO common to all programs in the dept. has been developed. | Yes |
| Q2 | Q2.1. Has the program made any other changes as a result of the assessment in the 2011-2012 academic year? <i>Comments:</i> | No |
| Q3 | Q3.1. Did the program explicitly list the learning outcome(s) assessed in the 2012-2013 academic year? <i>Comments:</i> PLOs 1 & 4. | Yes |
| | Q3.2. Did the program assess competency in the discipline (content knowledge (see Appendix 3 for more details)? <i>Comments:</i> | Yes |
| | Q3.3. Did the program EXPLICITLY assess any intellectual and practical skills, personal and social responsibilities, and integrative learning from the university baccalaureate learning goals (see Appendix 3 for details)? <i>Comments:</i> PLO 4 – written communication. | Yes |
| | Q3.3.1. If yes, please write down each learning outcome here: Effectively communicate mathematical thought. | |
| | Q3.3.2. If yes, were VALUE rubrics used to assess the above university baccalaureate learning goal(s)? <i>Comments:</i> See answer to Q3.1: A modified version of the Problem Solving VALUE Rubric was used. | Yes |
| | | |
| Q4. | Q4.1. Were direct measures (capstone class, portfolios, student papers, projects, key assignments, etc.) used to assess the learning outcomes? <i>Comments:</i> Exam files from core courses are used for assessment. | Yes |
| | Q4.1.1. If direct measures were used, were the rubrics used to evaluate student work (projects, papers, and key assignments) aligned directly with the program learning outcome(s)? <i>Comments:</i> 1) It is not clear whether the learning outcomes assessed are program learning outcomes or course learning outcomes. 2) It is not clear how each dimension of the rubric is connected to each program and course learning outcomes assessed. | Not clear |
| | Q4.1.2. If direct measures were used, were those who review student work calibrated to apply assessment criteria in the same way? <i>Comments:</i> Not enough information is provided. | Not clear |
| | Q4.1.3. If direct measures were used, were there checks for inter- | Not clear |

| | | |
|----|--|-----------|
| | <p>rater reliability? <i>Comments:</i> Not enough information is provided.</p> | |
| | <p>Q4.1.4. If direct measures were used, were the sample sizes for student work adequate? <i>Comments:</i> No sample size is provided.</p> | Not Clear |
| | <p>Q4.2. Were indirect measures (exit, employer, or alumni surveys, focus group interviews, etc.) used for assessment? <i>Comments:</i> The report indicates it will use alumni survey & exit interview for assessment, but no such data is provided.</p> | Not clear |
| | <p>Q4.2.1. If surveys were used, were the sample sizes adequate? <i>Comments:</i> No discussion included from surveys, exit interviews, graduate comprehensive exam or the capstone courses</p> | Not Clear |
| | <p>Q4.3. Were external benchmarking data, including professional licensure exams, nationally-normed comprehensive exams, or surveys used for assessment? <i>Comments:</i></p> | No |
| | <p>Q4.4. Were other methods used for assessment? Specify:</p> | No |
| | <p>Q4.5. Were ALL the assessment methods that were used good measures for the program learning outcome(s)? <i>Comments:</i> There are two program-level learning outcomes and five course-level learning outcomes being assessed with a Mathematics Reasoning Rubric based on the Problem Solving VALUE Rubric. It is unclear how the rubric is used to examine the course-level learning outcomes, and how the learning outcomes at two different levels aligned with each other.</p> | Not Clear |
| | <p>Q4.6. Did the program indicate explicitly where the learning and/or assessment occurred in the curriculum? <i>Comments:</i> MATH 108, 110 and 130 are clear, however, not enough information about the program level is provided.</p> | Sometimes |
| Q5 | <p>Q5.1. Were criteria and/or standard performance given for each assessment tool? <i>Comments:</i></p> | Not clear |
| Q6 | <p>Q6.1. Was data collected? <i>Comments:</i> From final exams in MATH 110B and 130A; two questions from each exams were analyzed using the rubric</p> | Yes |
| | <p>Q6.1.1. If yes, was the data of high quality (reliable or valid)? <i>Comments:</i> See comments in Q4.1.1, Q4.1.2, Q4.1.3, and Q4.5.</p> | Not clear |
| | <p>Q6.2. Did the data from all the different assessment tools directly align with each learning outcome (validity)? <i>Comments:</i> See “Comments” in Q4.1.1 and Q4.5.</p> | Not clear |
| Q7 | <p>Q7.1. Did the program propose how to use the assessment results to improve the program? <i>Comments:</i> the Core Program is the focus of assessment, and as learning outcomes are developed for MATH 108, the rubric can be</p> | Yes |

| | | |
|----------|--|-----------|
| | used at all levels of the Core. | |
| | Q7.2. If changes were described, did the program indicate any plan to conduct a follow-up assessment? <i>Comments:</i> | Yes |
| Q8 | Q8.1. Does the program list a specific program learning outcome that will be assessed in the 2013-14 academic year? <i>Comments:</i> The assessment of learning outcomes will be continued but it does not specifically indicate which learning outcomes will be assessed. | No |
| | Q8.1.1. If yes, please specify: They say that they will continue the assessment initiated in the 12/13 cycle. | N/A |
| Appendix | Are appendices related to the assessment report? <i>Comments:</i> | N/A |
| Summary | S1. Does the program follow the required assessment template? <i>Comments:</i> | Yes |
| | S2. Is the assessment report easy to read and understand? <i>Comments:</i> For the most part. The inclusion of PLOs or reference to courses from which no data were collected provided some unnecessary distraction. | Sometimes |

¹. See Appendix I for the exact wording for and the eight questions (Q1 to Q8).

². Response options for the "Simple Feedback": 1) Yes; 2) Mostly; 3) Sometimes; 4) No; 5) Not clear; 8) N/A (Not Applicable).

Other comments:

As the program continues its annual assessment efforts, we encourage it to:

1. Assess program learning outcomes (PLOs), not individual courses or assessment tools;
2. Critically evaluate whether PLOs together with the **assignments, the standards of performance and the data at or near graduation**, demonstrate the meaning, quality, and uniqueness of these programs;
3. Use curriculum maps, backward design, and/or VALUE rubrics to explicitly indicate where **learning, assessment, and improvement** take place for EACH program learning outcome (PLO). In which classes do program faculty members introduce, develop, and/or master each PLO (not CLO: course learning outcome)?
4. Clearly present the data and explain the results and conclusions for **EACH PROGRAM LEARNING OUTCOME** (not for each course and/or for each assessment tool) so it is **easy for the faculty and the general public to understand** the conclusions for each program learning outcome;
5. Think about who is going to use the assessment data: the instructor, the department, the college, the university, or WASC. This will help the program decide what the program

learning outcomes will be, what kinds of data it needs to collect, what kind of measures it needs to use, and how **the data and findings** should be reported so the report and its findings are easy to understand and/or use.

III. General Recommendations

As we move forward with our assessment, we would strongly encourage all academic units to:

(Program Learning Outcomes and Their Alignment)

1. Clearly articulate the program learning outcomes (PLOs): What students should know, value, and be able to do **at or near graduation**.
2. Align these outcomes with the missions and visions of the university and the academic unit.
3. Specify how these PLOs (together with the standards of performance at graduation) are able to demonstrate the **meaning, quality, integrity and uniqueness** of the degree program.
4. Use backward design, curriculum maps, and PLOs/VALUE rubrics to demonstrate explicitly where learning (introduced, developed, and applied/mastered) and assessment (such as activities and assignments) occur in the curriculum and co-curriculum for each learning outcome.
5. Include professional accreditation standards and the University Baccalaureate Learning Goals, such as critical thinking, information competency, oral communication, written communication, and quantitative reasoning (the 5 WASC core competencies) in the PLOs.
6. Develop/adopt program learning outcomes directly from *The Degree Qualifications Profile* (http://www.luminafoundation.org/publications/The_Degree_Qualifications_Profile.pdf) so there are clear distinctions and connections among associate, graduate, and undergraduate expectations.

(Measures, Rubrics and Their Alignment)

7. Adopt nationally developed rubrics such as the 16 VALUE rubrics (http://www.aacu.org/value/rubrics/index_p.cfm?CFID=41012296&CFTOKEN=24714954) to explicitly assess student complex skills and values.
8. Make sure that the rubric(s) used in any course(s) to evaluate/assess student work (projects, papers, and key assignments) align directly and explicitly with program learning **outcome(s) and the key assignment(s)**.
9. Use curriculum maps to make sure key assignments/projects or survey questions directly and explicitly assess all dimensions of the program learning outcome(s).
10. Use direct measures to assess student learning outcomes.

(Standards of Performance at Graduation)

11. Develop **explicit** standards of performance for all assessment tools and program learning outcomes and report the percentages of students who meet these standards **at graduation**.
12. Include program learning outcomes, rubrics, and standards of performance at graduation in all course syllabi and catalogs so everyone, including students, faculty, and the general public, would know them.

(Data Collection and Presentation)

13. Make sure the data collected is reliable and valid.
14. Make sure the data presented is simple and clear for the faculty and the general public to understand.
15. Use capstone course(s)/projects to **directly** assess student learning outcomes at graduation.

16. Use external benchmarking data, including national/statewide/professional exams, for assessment.
17. Use student self-reflection to assess student learning outcomes.
18. Collect basic information so the program would know the major classes students have taken and how many students from a particular class, such as the capstone class, are in the major.
19. Collect the number of units students have taken so far so the program would know this information.
20. Collect any other key social and demographic data about the students, so the program would have a better understanding of students' background and their learning.

(Use of Assessment Data)

21. Use assessment data and feedback from the Office of Academic Program Assessment to update the assessment plan and improve student learning, assessment, curriculum, planning, and budgeting.
22. Use curriculum maps to show how the whole curriculum (not just the course where the data is collected) plans to improve the specific learning outcome(s) assessed the previous year.
23. Think about who is going to use the assessment data.
24. Conduct follow-up assessments to see if any changes have significantly improved student learning.

IV. Program Summary and Assessment Status

Table 1: Department Assessment Status for the 2012-2013 Academic Year ¹

| Majors | Diploma Concentrations | Program Code | Program Status ² | Assessed in 2012-13 ³ | Enrollment in Fall 2012 | External Accreditation |
|---|---|--------------|-----------------------------|----------------------------------|-------------------------|------------------------|
| BA | | | | | | |
| 1. BA in Mathematics | 1.1. BA Pure Mathematics | 17011 | ? | Yes | 210 | No |
| | 1.2. BA Applied Mathematics and Statistics | ? | ? | Yes | 0 | ? |
| | 1.3. BA Teacher Preparation (for middle and high school teaching) | ? | ? | Yes | ? | ? |
| 2. BA in Integrated Mathematics/Single Subject Credential Program (for middle and high school teaching) | | ? | ? | Yes | ? | ? |
| 3. BA in Mathematics and Applied Computing | | ? | ? | Yes | 17 | No |
| Subtotal | ? | | | | 227? | |
| MA: | | | | | | |
| 1. MA in Mathematics | | 17011 | ? | No | 26 | No |
| Other: | | | | | | |
| 1. Minor in Mathematics | | N/A | ? | No | ? | No |
| 2. Minor in Statistics | | N/A | ? | No | ? | No |
| Department Total: | | | | | 253? | |

1. Sources: 1). *The 2012-2013 Annual Assessment Report* by Department of Mathematics and Statistics (2013);
2). *Department Fact Book 2013* by Office of Institutional Research (2013);
3). "Sacramento State University Catalogue" (<http://catalog.csus.edu/current/programs/coms.html>);
4). "Listing of CSU degree programs" (<http://degrees.calstate.edu/>).
2. Response options for "Program Status": 1) No change; 2) Merged; 3) Added; 4) Dropped; 5) Plan to add; 6) Plan to drop; 7) Other.
3. If a degree program is just added or planned to be dropped, it does not need to be assessed. In this case, we would just use "N/A, not applicable" to describe its assessment status.

Table 2: Department Assessment Status for 2011-2012
(Based on the 2011-2012 annual assessment report and the feedback from OAPA)

| | Assessment Plan | Program Learning Outcomes | Data Collected | Data Used for Change | Impact of Changes Assessed | Fall 2011 Enrollment | Accredited |
|---|---------------------------|--|-----------------------|-----------------------------|-----------------------------------|-----------------------------|-------------------|
| Mathematics BA | Developed & updated | Developed & assessed | Yes | Yes | Unable to determine | 242 | No |
| Math/Single Subject Credential Program | Same as in Mathematics BA | Same as in Mathematics BA | Yes? | Yes? | Unable to determine ? | 17 | Yes? |
| BA in Mathematics and Applied Computing | Developed | Developed but unable to determine if they are assessed differently from Mathematics BA | Unable to determine | Unable to determine | Unable to determine | 13 | No |
| Mathematics MA | Developed & updated | Developed & assessed | Yes | Yes | Unable to determine | 28 | No |
| Minor in Mathematics | Not developed | Not developed | No | No | No | 53 | No |
| Minor in Statistics | Not developed | Not developed | No | No | No | 4 | No |
| Total Department | | | | | | 357 | |

Appendix 1: The 2012-2013 Annual Assessment Report Template

Introduction

All annual assessment reports should be submitted by the academic unit (College/Department/Program) to the College Dean for review and onward transmittal to Academic Affairs. Reports are due in Academic Affairs no later than **July 1 each year** in electronic format.

Please directly answer the following questions and make sure the answers to each question are written in a way that is easy for the general public and for the students, faculty, staff, and administrators **to understand and to use**. To ensure that these diverse readers have enough information to **evaluate all parts of the report** -- the learning outcomes, the methods/data, the criteria/standards of performance, the interpretations, and the conclusions -- please make sure you have provided enough information about them and how you have selected your sample (e.g. students or their work) and how you have analyzed and interpreted the data. There is no specific length expectation, although conciseness should be the goal.

Q1. As a result of last year's assessment effort, have you implemented **any changes for your assessment including learning outcomes, assessment plan, assessment tools (methods, rubrics, curriculum map, or key assignment etc.), and/or the university baccalaureate learning goals?**

- a. If so, what are those changes? How did you implement those changes?
- b. How do you know if these changes have achieved the desired results?
- c. If no, why not?

Q2. As a result of last year's assessment effort, have you implemented **any other changes at the department, the college or the university, including advising, co-curriculum, budgeting and planning?**

- a. If so, what are those changes? How did you implement those changes?
- b. How do you know if these changes have achieved the desired results?
- c. If no, why not?

Q3. What **PROGRAM** (not course) learning outcome(s) have you assessed this academic year?

Q4. What method(s)/measure(s) have you used to collect the data?

Q5. What are the criteria and/or standards of performance for the program learning outcome?

Q6. What data have you collected? What are the results and findings, including the percentage of students who meet each standard?

- a. In what areas are students doing well and achieving the expectations?
- b. In what areas do students need improvement?

Q7. As a result of this year's assessment effort, do you anticipate or propose any changes for your program (e.g. structures, content, or learning outcomes)?

- a. If so, what changes do you anticipate? How do you plan to implement those changes?
- b. How do you know if these changes will achieve the desired results?

Q8. Which program learning outcome(s) do you plan to assess next year? How?

Appendix 2: WASC “Rubric for Assessing the Quality of Academic Program Learning Outcomes”

<http://www.aacu.org/value/index.cfm>

| Criterion | Initial | Emerging | Developed | Highly Developed |
|---------------------------|---|--|---|--|
| 1. Comprehensive List | The list of outcomes is problematic: e.g., very incomplete, overly detailed, inappropriate, and disorganized. It may include only discipline-specific learning, ignoring relevant institution-wide learning. The list may confuse learning processes (e.g., doing an internship) with learning outcomes (e.g., application of theory to real-world problems). | The list includes reasonable outcomes but does not specify expectations for the program as a whole. Relevant institution-wide learning outcomes and/or national disciplinary standards may be ignored. Distinctions between expectations for undergraduate and graduate programs may be unclear. | The list is a well-organized set of reasonable outcomes that focus on the key knowledge, skills, and values students learn in the program. It includes relevant institution-wide outcomes (e.g., communication or critical thinking skills). Outcomes are appropriate for the level (undergraduate vs. graduate); national disciplinary standards have been considered. | The list is reasonable, appropriate, and comprehensive, with clear distinctions between undergraduate and graduate expectations, if applicable. National disciplinary standards have been considered. Faculty has agreed on explicit criteria for assessing students' level of mastery of each outcome. |
| 2. Assessable Outcomes | Outcomes statements do not identify what students can do to demonstrate learning. “Statements understand scientific method” do not specify how understanding can be demonstrated and assessed. | Most of the outcomes indicate how students can demonstrate their learning. | Each outcome describes how students can demonstrate learning, e.g., “Graduates can write reports in APA style” or “Graduate can make original contributions to biological knowledge.” | Outcomes describe how students can demonstrate their learning. Faculty has agreed on explicit criteria statements such as rubrics, and have identified example of student performance at varying levels of each outcome. |
| 3. Alignment | There is no clear relationship between the outcomes and the curriculum that students experience. | Students appear to be given reasonable opportunities to develop the outcomes in the required curriculum. | The curriculum is designed to provide opportunities for students to learn and to develop increasing sophistication with respect to each outcome. This design may be summarized in a curriculum map. | Pedagogy, grading, the curriculum, relevant student support services, and co-curriculum are explicitly and intentionally aligned with each outcome. Curriculum map indicates increasing levels of proficiency. |
| 4. Assessment Planning | There is no formal plan for assessing each outcome. | The program relies on short-term planning, such as selecting which outcome(s) to assess in current year. | The program has a reasonable, multi-year assessment plan that identifies when each outcome will be assessed. The plan may explicitly include analysis and implementation of improvements. | The program has a fully-articulated, sustainable, multi-year assessment plan that describes when and how each outcome will be assessed and how improvements based on findings will be implemented. The plan is routinely examined and revised, as needed. |
| 5. The Student Experience | Students know little or nothing about the overall outcomes of the program. Communication of outcomes to students, e.g. in syllabi or catalog, is spotty or nonexistent. | Students have some knowledge of program outcomes. Communication is occasional and informal, left to individual faculty or advisors. | Students have a good grasp of program outcomes. They may use them to guide their own learning. Outcomes are included in most syllabi and are readily available in the catalog, on the web page, and elsewhere. | Students are well-acquainted with program outcomes and may participate in creation and use of rubrics. They are skilled at self-assessing in relation to the outcome levels of performance. Program policy calls for inclusion of outcomes in all course syllabi, and they are readily available in other program documents. |

Appendix 3: Sacramento State Baccalaureate Learning Goals for the 21st Century & AAC&U's 16 VALUE Rubrics

http://www.aacu.org/value/rubrics/index_p.cfm?CFID=38420924&CFTOKEN=68367906

1. **Competence in the Disciplines:** The ability to demonstrate the competencies and values listed below in *at least one major field of study* and to demonstrate informed understandings of other fields, drawing on the knowledge and skills of disciplines outside the major.
2. **Knowledge of Human Cultures and the Physical and Natural World** through study in the *sciences and mathematics, social sciences, humanities, histories, languages, and the arts*. Focused by engagement with big questions, contemporary and enduring.
3. **Intellectual and Practical Skills, Including:** *inquiry and analysis, critical, philosophical, and creative thinking, written and oral communication, quantitative literacy, information literacy, teamwork and problem solving*, practiced extensively, across the curriculum, in the context of progressively more challenging problems, projects, and standards for performance.
 - 3.1 Critical thinking (WASC core competency)
 - 3.2 Information literacy (WASC core competency)
 - 3.3 Written communication (WASC core competency)
 - 3.4 Oral communication (WASC core competency)
 - 3.5 Quantitative literacy (WASC core competency)
 - 3.6 Inquiry and analysis (Sixth VALUE rubric)
 - 3.7 Creative thinking (Seventh VALUE rubric)
 - 3.8 Reading (Eighth VALUE rubric)
 - 3.9 Teamwork (Ninth VALUE rubric)
 - 3.10 Problem solving (Tenth VALUE rubric)
4. **Personal and Social Responsibility (Values), including:** *civic knowledge and engagement—local and global, intercultural knowledge and competence*, ethical reasoning and action, foundations and skills for lifelong learning* anchored through active involvement with diverse communities and real-world challenges.
 - 4.1 Civic knowledge and engagement—local and global (Eleventh VALUE rubric)
 - 4.2 Intercultural knowledge and competence (Twelfth VALUE rubric)
 - 4.3 Ethical reasoning (Thirteenth VALUE rubric)
 - 4.4 Foundations and skills for lifelong learning (Fourteenth VALUE rubric)
 - 4.5 Global Learning (Fifteenth VALUE rubric)
5. **Integrative Learning **, including:** *synthesis and advanced accomplishment* across general and specialized studies.
 - a. Integrative and applied learning (Sixteen VALUE rubric)

All of the above are demonstrated through the application of knowledge, skills, and responsibilities (values) to new settings and complex problems.

**Understanding of and respect for those who are different from oneself and the ability to work collaboratively with those who come from diverse cultural backgrounds.*

*** Interdisciplinary learning, learning communities, capstone or senior studies in the General Education program and/or in the major connecting learning goals with the content and practices of the educational programs including GE, departmental majors, the co-curriculum and assessments.*

Appendix 4: Important Considerations for Program Review & Assessment

Please keep the following questions in mind when you (program, department, or the college) assess student learning outcomes and improve the programs:

- 1) What are your program learning outcomes (PLOs): **what should your students know, value, and be able to do (at the time of graduation)?** Are the PLOs aligned closely with the missions and vision of the university and the college/department/program? Is each program learning outcome aligned closely with the curriculum, the key assignment, pedagogy, grading, the co-curriculum, or relevant student support services?
- 2) Is each PLO assessable? What **rubrics** are used to assess a particular program learning outcome? What are the explicit **criteria** and **standards of performance** for each outcome? Have you achieved the learning outcomes: **the standards near or at graduation?**
- 3) **What are the data, findings, and analyses for EACH program learning outcome? What is the quality of the data: how reliable and valid is the data?** Other than GPA, what data/evidences are used to determine whether your graduates have achieved the stated outcomes for the degree (BA/BS or MA/MS)? If two or more pieces of assessment data are used for each outcome, is the data consistent or contradictory?
- 4) Are these PLOs (together with the data and the standards of performance **near or at graduation**) able to demonstrate the **meaning, quality, integrity and uniqueness** of your degree program?
- 5) **Who is going to use the data?** Are the data, findings, or analyses clearly presented so they are easy to understand and/or use? Is the data used only for the course or for the program where the data is collected, or is the data also used broadly for the curriculum, budgeting, or strategic planning at the department, the college, or the university?
- 6) **Are students aware of these learning outcomes?** Do they often use them to assess the learning outcomes themselves? Where are the program learning outcomes published for view, e.g., across programs, with students, in the course syllabus, the department websites or catalogs? Are they widely shared?
- 7) Has the program conducted **follow-up assessment** to evaluate the effectiveness of program changes made based on assessment data? **If yes, how effective are those changes to improve student learning and success?** If no, what's your plan to assess the effectiveness of those changes?
- 8) **Is there an assessment plan for each unit (program, department, or college)?** Have curriculum maps been developed? Does the plan clarify when, how, and how often each outcome will be assessed? Will all outcomes be assessed over a reasonable period of time such as within a six-year program review cycle? Is the plan sustainable in terms of human, fiscal, and other resources? Will the assessment plan be revised as needed?

Appendix 5: Relevant Verbs in Defining Learning Outcomes

(Based on Bloom's Taxonomy)

| Knowledge | Comprehension | Application | Analysis | Synthesis | Evaluation |
|-----------|---------------|-------------|---------------|-------------|--------------|
| Cite | Arrange | Apply | Analyze | Arrange | Appraise |
| Define | Classify | Change | Appraise | Assemble | Assess |
| Describe | Convert | Compute | Break Down | Categorize | Choose |
| Identify | Describe | Construct | Calculate | Collect | Compare |
| Indicate | Defend | Demonstrate | Categorize | Combine | Conclude |
| Know | Diagram | Discover | Compare | Compile | Contrast |
| Label | Discuss | Dramatize | Contrast | Compose | Criticize |
| List | Distinguish | Employ | Criticize | Construct | Decide |
| Match | Estimate | Illustrate | Debate | Create | Discriminate |
| Memorize | Explain | Interpret | Determine | Design | Estimate |
| Name | Extend | Investigate | Diagram | Devise | Evaluate |
| Outline | Generalize | Manipulate | Differentiate | Explain | Explain |
| Recall | Give Examples | Modify | Discriminate | Formulate | Grade |
| Recognize | Infer | Operate | Distinguish | Generate | Interpret |
| Record | Locate | Organize | Examine | Manage | Judge |
| Relate | Outline | Practice | Experiment | Modify | Justify |
| Repeat | Paraphrase | Predict | Identify | Organizer | Measure |
| Reproduce | Predict | Prepare | Illustrate | Perform | Rate |
| Select | Report | Produce | Infer | Plan | Relate |
| State | Restate | Schedule | Inspect | Prepare | Revise |
| Underline | Review | Shop | Inventory | Produce | Score |
| | Suggest | Sketch | Outline | Propose | Select |
| | Summarize | Solve | Question | Rearrange | Summarize |
| | Translate | Translate | Relate | Reconstruct | Support |
| | | Use | Select | Relate | Value |
| | | | Solve | Reorganize | |
| | | | Test | Revise | |

Page 37: Adapted from Gronlund (1991).

Allen, Mary. 2004. "Assessing Academic Programs in Higher Education". San Francisco, CA: Anker Publishing, Part of Jossey-Bass.

Appendix 6: Background Information for Academic Program Assessment and Review

Ideally, academic program assessment and review at Sacramento State should be an ongoing process that facilitates continuous program improvement and includes the following areas¹:

Assessment Plan: Each program needs to develop a program assessment plan which contains the following elements: Program goals and learning outcomes, methods for assessing progress toward these outcomes, and a timetable. This plan should be updated annually or frequently.

Annual Program Assessment Report: Program learning outcomes (PLOs) should be directly aligned with course learning outcomes (CLOs) and the University Baccalaureate Learning Goals (UBLGs). Programs are asked to provide the Office of Academic Affairs with an annual report (annual assessment report -AAR) on program assessment activities that occurred during the past academic year. These reports should identify learning goals and outcomes that were targeted for program assessment, measures used to evaluate progress toward those outcomes, data and analysis, and changes made or planned in response to the results. Annual program assessment and the assessment reports provide a solid foundation and data for the six year program review at Sacramento State.

Program Review: Each department undertakes an extensive program review every six years. As part of the program review process, departments are asked to use annual program assessment data to evaluate how well students are meeting program learning outcomes and university learning goals.

Thus, each department in our university should have in place a system for collecting and using evidence to improve student learning. So far, not all departments have established program learning outcomes and/or approaches to assess learning for all degree programs; it is essential to make these expectations explicit. This will help departments and colleges to assure that every degree program has or will have in place a quality assurance system for assessing and tracking student learning, and use this information to improve their respective programs. Importantly, departments should also present learning expectations, data, findings, and analysis in a way that is easy to understand and/or to use by the faculty, students, administration, the general public, accreditation agencies, and policy-makers.

¹ Adapted from the information at <http://webapps2.csus.edu/assessment/>