Using Program Assessment Results to Improve Student Learning

Assessment Office
University of Hawai‘i at Mānoa
March 2013

Using Program Assessment Results to Improve Student Learning
Just as students’ performance in and evaluations of a course can help professors improve their individual classes, aggregated information on program-level student performance can be used to improve student learning in the degree program. In this workshop, the facilitator will discuss how faculty members can use program-level assessment results for program improvement. After listening to a short presentation, attendees will review examples of assessment results and discuss how programs could act upon the results to improve the program.

Attendees will leave knowing
a) specific ways to use assessment results (e.g., changes to curriculum, assessment procedures, program policies);
b) how to interpret results; and
c) strategies to help faculty act on results.

Level: Advanced beginner
Format: Interactive with a small group activity
Date/time/location: Friday, March 8, 2013, 1:30 pm - 2:45 pm, KUY106
Faculty specialists: Monica & Yao

Mission: Improve student learning through program assessment

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**Slide 3**

**Agenda**

1. Workshop outcomes  
2. Program assessment overview  
3. Interpretation & use of results  
4. Group work on scenarios  
5. Workshop evaluation
Today’s Outcomes

At the end of this workshop, you will be able to

1. List two possible reasons why programs may not have met their *criteria for success*
2. Name at least one way a program may use its results
3. Name one strategy to help faculty act on results
Program assessment is iterative and involves five steps. First, the program establishes learning outcomes, which describe what successful students know, do, and value at the end of the program. Next, the program creates learning opportunities for students such as projects, writing assignments, oral presentations, etc. The program collects and analyzes student work in order to determine how well students are meeting the learning outcomes. Using those assessment results, the program develops and implements an improvement plan to evolve the program so that student learning is improved. An improvement plan can also include how the program will celebrate and advertise success when its assessment results indicate that students are meeting the learning outcomes at a high standard.
Today’s I will focus on moving from assessment results to an improvement plan.
Before assessment results can be interpreted and used, the program needs to decide what it takes for the program to be deemed successful in the area of student learning. The program asks, “What student results are needed for us to claim that we are satisfied with the learning assessment results?”
In the case of sports, say the high jump, it’s easy to determine what’s needed and what success looks like: if the jumper clears the bar, he’s successful. An academic program needs to set its “bar,” which specifies the results needed.

Image Source: USTFCCCA Awards 12 Regional Honors To Big 12; 6/6/2011
http://www.big12sports.com/ViewArticle.dbml?DB_OEM_ID=10410&ATCLID=205157403
Slide 10

Criteria for success

A statement of what is needed for the program to claim it met its goal for student learning.

I’m going to call the bar the criteria for success. This is a statement of what is needed for the program to claim it met its goal for student learning. This can be also called a benchmark.

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Criteria for success

Example

90% of the graduating seniors will score “3” or higher on the Critical Thinking Rubric.

It’s a simple statement like this one, “90% of the graduating seniors will score “3” or higher on the Critical Thinking Rubric.”
After the program determines its criteria for success, it compares the assessment results to those criteria. Now there are only two options: either the results met the criteria or they did not. When the criteria are met, the program celebrates success. When the criteria are not met, the program changes or evolves the program.
The use of results is fairly straightforward if the criteria for success have been met. The current program is working and so it’s time to celebrate and publicize that success. There are many ways to publicize such as updating the program brochure with the assessment results, describing the high level of student accomplishment in the alumni newsletter, posting the results on a department website or department flier, sharing results with students during advising or in classes.
Another thing to keep in mind is that the good practices should continue. For example, the Department of English was disappointed with students’ scores on the information literacy rubric. So the following academic year the faculty had their students attend more workshops offered by librarians. After implementing the additional time with librarians, students’ scores on the information literacy rubric increased. To ensure that students keep meeting the learning outcome at the desired level, the faculty needs to continue the good practice of partnering with librarians.

I’ll also mention that successful programs may also consider raising standards and pushing students to achieve at even higher levels.
When a program is disappointed with its assessment results because the criteria for success were not met, the assessment committee or assessment coordinator needs to think critically about the program and the assessment procedures to identify possible causes.

Today I’m going to focus on common reasons. You can start your investigation with these. You can also enlist the help of other faculty in the department. Asking them to speculate on reasons can help your investigation and more importantly, getting other faculty members to discuss the results is a strategy that can lead to the faculty using the results to make changes that can lead to more students meeting the standards.
I’m going to talk about 3 common reasons why the criteria for success may not have been met: a) alignment, b) curriculum, and c) student factors.
As you see here, no matter how wonderful the train is, how fast, etc., it will never make it to the station. It will always fail to reach the station because of an alignment issue. If a program has poor assessment results, the assessment team should ask, “Did students fail to reach the station because of an alignment issue?”

Let me give you three examples.
First, the program can investigate whether the assessment task is EXPLICITLY and DIRECTLY aligned with the test questions or the scoring rubric.

In this example above, students were asked to describe. But description earns them only a “1” on the rubric. Students who expertly describe will still be rated low.

When we evaluated student work to determine how well the students were at ethical reasoning, the faculty members scoring the student work found that 15% of the assignments were not aligned with the ethical reasoning outcome. To receive a high score on the rubric, the student needed to think critically about the situation and apply ethical reasoning skills. 15% of assignments did not explicitly ask students to demonstrate high level thinking skills. Instead, these assignments typically asked students to identify and describe the ethics. Description earned students only a “2” out of “4” on the rubric. This resulted in the program not meeting the criteria for success.

The program can use this knowledge via these results to **improve the assignment design**. Changing the assignment directions may be all that is needed. The assessment committee or assessment coordinator can work with faculty – share the rubric and discuss the learning outcome. See if the assignment directions can be changed to explicitly ask students to demonstrate the knowledge and skills that the program is looking for.
Second, the assessment committee can ask, “Did the assessment task mirror what students were learning and doing in class?”

If the assessment task is a multiple choice test and in courses students have been completing complex projects, writing papers, creating portfolios, etc., there is an alignment problem that can result in students not doing well on the assessment task. And vice versa. Students who take the textbook’s end-of-chapter multiple choice tests will not be prepared for an assessment task that asks them to write a research paper that demonstrates critical thinking and problem solving.

When a program discovers that the assessment task and course activities are not aligned, the faculty can revisit the program learning outcome and goals to help them decide what action to take.

If the program learning outcome states that students will be able to apply theories to contemporary social issues and consider multiple perspectives, performance-based tasks in courses and on assessment tasks is probably more appropriate than a multiple-choice test. However, if the program’s learning outcome states that students will be able to identify or recognize, multiple-choice tasks can work well.
Third, the assessment committee can ask, “Were students led to believe they were doing fine and meeting the standard, when they actually weren’t?

Students should be aware of and have experienced the required performance standards for senior or exit level work BEFORE they are assessed for mastery at the senior or exit level.

If the practice questions on a test are much easier than the questions on the exit test, students will be unclear about the standard of performance required. If students are receiving “A” grades on their lab reports during their junior and senior year, they are led to believe they are “excellent” and have met the department’s standard of performance.

I’ve seen cases where the department pulls samples of student work for review and discussion by faculty members who are NOT the course instructor and these faculty members believe the student work is not acceptable quality. There is a mismatch of performance standards between the courses and the exit standard.

To remedy this situation, program faculty can discuss examples of student work at a department meeting and decide on a minimum performance standard for graduation. So the use of results in this scenario is to clearly establish what quality student work looks like and to share that with faculty and students.

In the case of graduate studies, it’s typically left to the faculty advisor or chair of the committee to help students understand the expected standard of performance for the dissertation and master’s thesis. The members of the dissertation and thesis committees can help guide the chair.
The curriculum may also be the reason why results fell short.
Learning is difficult, especially the higher-order cognitive skills that we seek to develop in our students. They need a lot of practice and constructive feedback in order to meet our high standards. The curriculum should provide students with sufficient opportunities to learn--the more difficult the skill or knowledge, the more opportunities needed.

Nearly every program has a curriculum map. The assessment committee can examine the curriculum map, talk to professors teaching certain courses, and review syllabi to find out more about how many explicit opportunities students actually had to practice a skill, apply knowledge, or discuss values.

In this case (above), the assessment committee will quickly see that oral communication is emphasized and directly taught in only one course. So it should be no surprise that students exit without having achieved the status of a skilled orator.

There's two approaches to take. First, the faculty can identify courses that can add direct instruction and practice with oral communication into the existing courses’ curriculum. Another route is what American Studies did: when students could not meet their research standard because they did not have enough practice, they created a new course on research methods that students complete before entering the senior research course.

A strategy to help faculty make these changes is to provide faculty development. The faculty boards who work with general education outcomes offer workshops and consultations. The assessment committee can ask for them to make a presentation or provide resources so that faculty members have the tools they need to add opportunities to learn to courses.
Good instructional methods have a greater chance of ensuring student learning. Research with kids has shown that some kids will always learn, regardless of the instructional method. But a good number of other kids, especially those from different backgrounds than the teacher, need good instruction. We can learn to be better teachers.

If the program does not meet its criteria for success and students have had sufficient opportunities to learn, check if the instructional methods could be changed to be more effective.

For example, for skill-based outcomes such as writing or solving problems, students may need structured practice with frequent feedback. If the current instructional method is lecture during class and students complete homework outside of class, consider flipping the classroom: have students read or listen to the lecture as homework and spend class time working on the desired skill with help from TAs, the professor, or peers. Biology and other departments are trying this approach and taking advantage of the recently remodeled classroom in Webster that is set up for student groups to collaboratively solve problems and present work to others.

To help faculty make this change, the Center for Teaching Excellence can provide professional development workshops and materials. A strategy to help faculty use results in circumstances like these is to put the information on good teaching in their hands and encourage them to try one new instructional method in a course.
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Criteria for success

- Met
- Not met

2a. Alignment
2b. Curriculum
2c. Student factors

Students definitely play a role in assessment results.
Poor results could be because students were not motivated to perform their best on the assessment task for program assessment. For example, recently one program made the assessment test optional for students. It was not counted as part of a course grade. In fact, students who opted out did not have to go to class on the test day. They were given a free pass. Students who did take the test were never given their results. In this case, the assessment committee should be questioning the accuracy of the results because the results probably do not represent the program or the students’ best work.

Research has shown that student motivation matters and it matters a lot. If the assessment committee suspects that motivation is an issue, the program can help motivate students by setting up consequences such as tying an assessment to a course grade. Student motivation can also be enhanced by sharing assessment results with students and explaining the changes the program made in order to improve student performance and experience.
Those who completed the task are not representative or too few in number

Student sample of 1

The assessment committee can ask, “Are the students who completed the task representative of students in the degree program?” And ask, “Did enough students complete the assessment task for us to draw conclusions?”

If the students are not representative because they are volunteers or only students in the honors section or for some other reason like only the equivalent of Albert Einstein was selected, the assessment committee can use this knowledge to change the data collection procedures for the next assessment project. **Consider taking a random sample from each section.**

Some of our graduate programs have 2-3 graduates per year. They need to **collect data across multiple years to have a large enough pool of students** from which to draw conclusions. On their assessment reports, these programs indicate that the results and use of results are pending until more students complete the program.

Transfer students may not have had the same opportunities to learn and practice as students who completed their entire degree at UH Mānoa. Because Mānoa accepts more transfer students than first-time freshmen every year, it’s possible that many of your majors completed the bulk of their courses at different institutions. Nationally, transfer is common: 1 in 3 students transfer and the number is on the rise.

If the program determines that transfer students are differently prepared than students who started at Mānoa, I have one suggestion at this time. Faculty in the program can help the transfer students make explicit connections between what they previously learned and what is now expected of them. This knowledge can help them use existing knowledge and skills so they are more likely to succeed, know when seek help, and to enroll in different courses that are suited to their needs as learners.

This requires faculty members to make overt connections during class and in office hours in order to help students learn to think about their past, present, and future learning.
To recap, when I look at program results, these are the things I consider: alignment, curriculum, student factors.
I’ve given you common reasons that the criteria for success were not met and some examples of how programs have used results.

Now I’m going to categorize the major places that programs can look to when they are planning to evolve the program or make changes for program improvement.

On the handout, I’ve given examples of where programs have made changes in each category. I’m going to talk about one item from each category and during the group activity or later you can read the remaining items for additional ideas.
If students are not meeting the criteria for success, consider changing the curriculum. For example, course content. If the program learning outcomes specify that students know and can apply theories, see if faculty members would be willing to have an informal department policy that those teaching 300-level courses will review the major theories.
If results fall short because students do not have sufficient opportunities to learn, look at the resources devoted to that area of student learning. For example, if geography’s learning outcome calls for students to do GIS mapping, they need GIS technology. If the Creative Media program’s outcome is about advanced film techniques, they need appropriate film equipment. The assessment committee can ask if resources are hindering students’ ability to meet the desired level of achievement and the program can take steps to rectify the situation if resources are needed.
Sometimes out-of-class experiences can be changed so that students are more likely to meet the program’s outcomes.

Changes to advising can help students meet the program learning outcomes. When students know what they are supposed to be learning, they are more likely to learn it. If advisers and students collaboratively complete a SLO checklist and use it to guide course registration, students’ awareness of the outcomes increases and the advisers help students reflect on their strengths and weaknesses. This awareness can help students become better learners.
Finally, something in the assessment process may need to be changed. The assessment question that drives an assessment project needs to be meaningful to the faculty. When it’s not a meaningful question, the faculty are not motivated to participate which can have an effect on the results. The assessment committee or assessment coordinator can talk with their faculty colleagues informally or use a department meeting to determine if there’s a particular learning outcome that they are interested in working on.
In my experience, most programs at Mānoa are working pretty well. When the program falls short of the criteria for success, please remember that small changes can have a big impact. The program probably does not have to overhaul the curriculum or the faculty. Small changes include
--adding the same assignment, for example a case study, to multiple courses so student have more practice.
--sharing rubrics and models of good work with students to establish a clear standard of performance.
--offering brown bag lunch sessions with potential employers to increase student motivation.

A more aggressive change is to add a course when students really need a lot more practice and instruction, e.g., a research methods course as American Studies did.
Your Turn . . .

- Discuss the scenario with your tablemates
- Answer the 4 questions
- Be ready to share
  - One reason
  - One action
  - One way to help faculty act on the results

Please discuss the scenario with your tablemates and answer the four questions. Be ready to share one reason, one action, and one way to help faculty act on the results.

Thank your tablemates for their manaʻo. May I have a volunteer to share one reason, one action, and one way to help faculty act on the results?
Please complete a workshop evaluation form.

Thank you!

Assessment Office
Monica Stitt-Bergh & Yao Hill
University of Hawai‘i at Mānoa
Using Program Assessment Results to Improve Student Learning
3/8/2013 Workshop

Criteria for success example: 90% of the graduating seniors will score “3” or higher on the Critical Thinking Rubric.

1. Criteria met
   a. Celebrate and publicize success
   b. Continue good practices

2. Common reasons why the criteria for success are not met
   a. Alignment
      i. Assessment task not aligned with test/rubric standards
      ii. Assessment task not aligned with course activities
      iii. Course-level standards not aligned with exit-level standards
   b. Curriculum
      i. Too few opportunities to learn given the high level of performance expected
      ii. Instructional methods ineffective
   c. Student factors
      i. Lack of student motivation on assessment task
      ii. Those who completed the assessment task are not representative or too few in number
      iii. Transfer students experienced a different curriculum

3. Program areas to consider changing & examples
   a. Curriculum
      i. Instructional methods: use problem-based inquiry instead of lecture-only pedagogy in core courses
      ii. Course content: review major theorists in all 300-level courses
      iii. Course sequence: add a pre-requisite
      iv. Frequency of course offerings: offer core courses every semester
   b. Resources
      i. Faculty: change emphasis for vacant position to include ability to teach a particular set of SLOs
      ii. Professional development: ask faculty to attend a workshop on giving students effective feedback on their writing
      iii. Technology, physical space, equipment: purchase equipment so students can practice GIS data modeling
c. Academic process
   i. Advising: ask advisers and students to collaboratively complete a SLO checklist and use it to guide course registration
   ii. Program advertising and program recruiting: revise brochure and webpage to emphasize the skills gained in the program
   iii. Career exploration and career services: offer brown-bag lunch series with local employers
   iv. Admissions standards: set “C” as minimum grade needed in certain courses before student can declare major

d. Assessment process
   i. Assessment question: ask a meaningful question that faculty are interested in answering
   ii. Assessment task: revise the task so it better meets the student learning outcomes
   iii. Data collection methods: randomly select students instead of relying on volunteers
   iv. Data collection methods: use existing class assignments because students are already motivated to do well on them because they count toward the course grade
Using Program Assessment Results to Improve Student Learning
3/8/2013 Workshop

**Scenarios** (based on actual programs but modified for this workshop)

### #1 Science Capstone

**Context.** A science program is using its senior capstone course to assess student learning, skills, and values. In the capstone, students complete one research project. The capstone products include the following: research proposal, research report, and oral presentation at the department mock conference. The course instructor evaluates the students’ written work using a Writing Rubric and the Research Ethics Rubric. Faculty who attend the department conference evaluate the oral presentations using the Speaking Rubric.

**Curriculum Map.**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Outcomes</th>
<th>Writing</th>
<th>Speaking</th>
<th>Research Methods</th>
<th>Research Ethics</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 + Lab</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>310 + Lab</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Elective: 320, 340, or 360</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>380</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>410 + Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Elective: 425, 435, or 445</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
</tr>
<tr>
<td>450 + Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480 Capstone</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

“X” = emphasized in course

**Capstone requirements and expectations (condensed).**

You will conduct a literature review, write a 4-page research proposal, carry out research, write a final 10-page research report, and orally present your research and findings at the department mock conference (15-minute presentation). The written products will be evaluated on the quality of content, clear and appropriate research methods, format, and quality of expression (i.e., grammar, word choice). The oral presentation will be evaluated on your ability to engage the audience with your “academic story,” speak with confidence and poise, answer questions from the audience, and select appropriate content.

**Criteria for success.** 95% of the student projects will score “3” Met Standard on each of the four rubrics: writing, speaking, research methods, and research ethics.

**Results.** 38 of the 40 graduating seniors completed the capstone course project.

Continued on back
Discussion questions.

1. Did the program meet its criteria for success?

2. What are 2 possible reasons why the criteria for success were met/not met?

3. What action might the program consider given these results?

4. How might the assessment team help faculty act on the results?
Using Program Assessment Results to Improve Student Learning
3/8/2013 Workshop

Scenarios (based on actual programs but modified for this workshop)

#2. English Literature Exit Exam

Context. The English undergraduate program decided to use two Graduate Record Exam (GRE) tests to determine if seniors had met program outcomes #1, #2, and #3. The program asked all graduating seniors to take the GRE Literature in English Test (230 multiple choice questions on British Literature, American Literature, and World Literature after 1925) and to take the GRE General Test which measures verbal reasoning (primarily multiple choice questions) and analytical writing (two 30-minute “analyze an issue” and “analyze an argument” writing tasks). The department agreed to pay their test fees: $185 for the General Test and $150 for the Literature in English Test.

Curriculum Map.

<table>
<thead>
<tr>
<th>Outcomes 1-3</th>
<th>1. Demonstrate knowledge of the major texts and traditions of literature, including texts and traditions of Hawai‘i and the Pacific region</th>
<th>2. Analyze texts closely in terms of style, figurative language, and literary conventions</th>
<th>3. Write well-argued essays that apply concepts from literary theory and criticism and include outside sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>301</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>321- 326</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>350-358</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>360-375</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>380-395</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>401</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>411- 418</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>430-445</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>451-456</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>470-486</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

“X” = emphasized in course

Criteria for success. 95% of the students will score
a) 580-980 on the GRE Literature in English Test,
b) 155-170 on the Verbal Reasoning section, and
c) 4.5-6.0 Analytical Writing section on the GRE General Test.

Results. 21 of the 145 graduating seniors took the GRE and reported their scores to the department.

<table>
<thead>
<tr>
<th>Literature in English Score 580-980 60th-99th percentile</th>
<th>Verbal Reasoning Score 155-170 65th-99th percentile</th>
<th>Analytical Writing Score 4.5-6.0 72th-99th percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Students (21 students total)</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Continued on back

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Discussion questions.

1. Did the program meet its criteria for success?

2. What are 2 possible reasons why the criteria for success were met/not met?

3. What action might the program consider given these results?

4. How might the assessment team help faculty act on the results?
Using Program Assessment Results to Improve Student Learning
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Scenarios (based on actual programs but modified for this workshop)

#3. Course-Embedded Assessment Project (Biostatistics)

Context. The Biostatistics program implemented a course-embedded assessment project to assess how well students can

a) clearly explain core biostatistics terms, concepts and theories;

b) apply statistical reasoning to contemporary biostatistics issues and policy problems;

c) apply appropriate quantitative techniques and conduct analysis using equations and graphs; and

d) effectively communicate results of research and analysis.

Three courses that cover these outcomes in depth were selected: BIOS 467, 477, and 480. Professors randomly selected 50% of their students and scored their final exams using the department’s agreed-upon scoring rubric (below). The results were aggregated by the assessment coordinator.

Curriculum Map.

<table>
<thead>
<tr>
<th>Courses</th>
<th>Terms, concepts, theories</th>
<th>Statistical reasoning</th>
<th>Quantitative reasoning</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>301</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>302</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>310, 350, 365, or 375</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>321</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>401-450</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>467</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>477</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>480</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

“X” = emphasized in course

Rubric.

<table>
<thead>
<tr>
<th>Quality Level</th>
<th>Outcome</th>
<th>1: Beginning</th>
<th>2: Approaching</th>
<th>3: Accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms, concepts, theories</td>
<td>Does not understand or apply biostatistics concepts; or confused</td>
<td>Describes biostatistics concepts, but does not clearly understand or apply them</td>
<td>Understands and applies concepts and theories in a clear and effective manner</td>
<td></td>
</tr>
<tr>
<td>Statistical reasoning</td>
<td>Does not identify question at hand and fails to think critically and solve problems</td>
<td>Identifies question at hand, but fails to think critically and solve problems</td>
<td>Identifies question at hand, thinks critically and solves problems in an illuminating way</td>
<td></td>
</tr>
<tr>
<td>Quantitative reasoning</td>
<td>Does not understand or apply quantitative skills to the topic/issue</td>
<td>Uses quantitative skills relevant to the topic/issue but applies them incorrectly or in an incomplete manner</td>
<td>Adeptly uses quantitative skills to address the issue/topic at hand</td>
<td></td>
</tr>
<tr>
<td>Communicate</td>
<td>Fails to communicate findings in a meaningful way</td>
<td>Communicates findings, but fails to stimulate interest from reader and/or communicates findings in an unclear manner</td>
<td>Communicates findings and stimulates interest from the reader and communicates findings in a clear manner</td>
<td></td>
</tr>
</tbody>
</table>

Continued on back
Criteria for success. At least 85% of the students will score “3” Accomplished, on each outcome.

Results.
115 randomly-selected students (49% of students enrolled in the three courses).

Discussion questions.
1. Did the program meet its criteria for success?

2. What are 2 possible reasons why the criteria for success were met/not met?

3. What action might the program consider given these results?

4. How might the assessment team help faculty act on the results?