Making Assessment
Simple, Practical, and USEFUL

Barbara E. Walvoord, Ph.D.
Professor Emerita
University of Notre Dame
Notre Dame IN 46556
Walvoord@nd.edu
Mobile: 574-361-3857
Effective Assessment in Departments

The Basic, No-Frills Departmental Assessment Plan

1. Learning goals (at the end of the program, students will be able to…)
2. Two measures:
   a. One direct measure (direct means student performance is directly evaluated, as in tests, exams, projects, interactions with clients, etc.)
      i. Review of senior work by faculty teaching seniors
      ii. If students take a licensure or certification exam, this will be added as a second direct measure
   b. One indirect measure (indirect means an intervening step, such as asking students what they thought they learned, or tracking their career or graduate school placement)
      i. My preference: senior student surveys and/or focus groups asking three questions:
         1. How well did you achieve each of the following departmental learning goals [use scale such as “extremely well, very well, adequately well, not very well, not at all”]
            [list each department goal, with scoring scale for each]
         2. What aspects of your education in this department helped you with your learning, and why were they helpful?
         3. What might the department do differently that would help you learn more effectively, and why would these actions help?
      ii. Second choice: Alumni surveys
      iii. In some fields, job placement rates will be important
3. Annual meeting to discuss data and identify action items.
   a. Set aside at least 2 hours to discuss ONE of your degree programs.
   b. Put the annual meeting is place NOW, without waiting for the perfect data.
   c. At the meeting, consider whatever data you have about learning, no matter how incomplete or inadequate.
   d. Outcomes of the meeting:
      i. ONE action item to improve student learning, with a timeline and assignment of responsibility
      ii. ONE action item to improve the quality of data, with a timeline and assignment of responsibility
   e. Keep minutes of the meeting
      i. To serve as your own record and reminder
      ii. To document for accreditors that assessment is taking place
Case History #1: Annual Meeting with Oral Reports from Faculty

- Department of Political Science, very successful, very busy, with growing numbers of majors and among the highest teaching evaluations at the university.
- Hated assessment, thought it was a waste of time and a plot to destroy faculty autonomy.
- But recognized that, in all the busyness, there was a danger that the undergraduate major was not getting enough attention. Were willing to institute the 2-hour annual meeting.
- At the meeting, no preparation had been done, no rubrics (most faculty hated them or did not know what they were).
- They went around the table, each faculty member who supervised or taught seniors named two strengths and two weaknesses that s/he observed in senior student work.
- One member kept a list on a flip chart.
- They decided to focus on one item that had come up a number of times: the inability of senior students, as they began their senior research projects, to construct a question for inquiry in the discipline.
- They decided first to examine their curriculum prior to the senior year, to see where they were giving instruction, practice, and feedback in constructing questions for inquiry. They completed the meeting by assigning responsibility and a time line for this investigation of the curriculum.
- At this meeting, they also decided they should conduct a short, 3-question survey of senior students, during one class day in the senior year, to ask them how well they thought they were prepared to construct questions for inquiry, what pedagogical strategies in their past courses had been most helpful, and what changes they would suggest.
- The curriculum committee constructed and administered the student survey and also mapped those points in the present curriculum where students received instruction, practice, and feedback in constructing questions for inquiry. The committee prepared recommendations for the department.
- At the end of that year, the department acted on these recommendations, making some changes to the curriculum, so as to give more instruction, practice, and feedback.
- The following year, they continued to implement the changes and to observe whether student skills improved. Meanwhile, they took up one of their other degree programs and began a similar assessment process.
- They kept minutes and records of their actions.

This system relies on tacit, rather than explicit goals, and on faculty reports of student strengths and weaknesses, without systematic written criteria. It trusts the observations of faculty, presented orally. In time, this faculty may find that this method is too informal, not sufficiently systematic or scholarly, and they may move to write explicit goals for student learning and criteria for the senior projects.

The next example demonstrates a department that took those two additional steps.
Case Study #2: Add Rubric-Based Faculty Evaluation of Student Work

- Department of biology.
- The department articulated a set of learning goals for undergraduate majors (Appendix A)
- They had a capstone course called “Biological Research.” To evaluate student work, the teacher developed a rubric (Appendix B)
- The department instituted the annual meeting.
- At the meeting, the capstone teacher(s) reported students’ strengths and weaknesses, using rubric scores (Appendix A, B). They also considered other evidence.
- The department decided to focus on students’ ability to design experiments.
- They did as the political science department had done.
- They reported their assessment process (Appendix A)

Case #3: Variations of the Department Meeting

Department of English at a community college

- They wanted to assess their literature courses, which students took as part of their Associate’s degree.
- The department had generated a list of goals for these courses.
- The courses were taught by many adjuncts, teaching at all times of the day and night, in several different locations; any single meeting could gather only a few of them.
- The department assigned its adjuncts and full-time faculty to small groups of 3-4 people, according to the time they could meet (e.g. the Wed., Oct. 12, 5 p.m. group). They asked the group to meet at a location of their own choosing for one hour and generate a list of two strengths and two weaknesses they saw in students, evaluated against the written goals for the core lit course. The group’s “recorder” then sent in the list.
- A committee compiled these lists and made recommendations for departmental action.
# Appendix A: Department of Biology Assessment Report

## Majors

(Note: similar matrices would be produced for general-education and graduate programs in the department)

### Learning Goals for Majors

1. Describe and apply basic biological information and concepts
2. Conduct original biological research and report results orally and in writing to scientific audiences
3. Apply ethical principles of the discipline in regard to human and animal subjects, environmental protection, use of sources, and collaboration with colleagues

Website and/or other avenues by which these are readily available to students, prospective students, and faculty

### Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>Goal 1</th>
<th>Goal 2</th>
<th>Goal 3</th>
<th>Use of the information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized test given to all seniors AND Final exams of three basic biology courses required of all majors</td>
<td>X</td>
<td></td>
<td></td>
<td>Data are reported to the department annually by the standardized exam committee and the instructors of the three basic courses. The department supports and encourages the instructors, takes any appropriate department-level actions, and reports meeting outcomes to dean or other body which has resources to address problems, and to those composing reports for accreditation or other external audiences. All data are reviewed as part of program review every seven years.</td>
</tr>
<tr>
<td>In senior capstone course, students complete an original scientific experiment, write it up in scientific report format, and also make an oral report to the class. The instructor(s) use explicit criteria to evaluate student work.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Annually, the senior capstone instructor(s) share students' scores with the department. The department takes action as above.</td>
</tr>
</tbody>
</table>
### Measures

<table>
<thead>
<tr>
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<th>Goal 3</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Alumni survey asks how well alums thought they learned to conduct and communicate scientific research</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Data reviewed annually by department for action, as above</td>
</tr>
<tr>
<td>Sample of regional employers gathered two years ago to reflect how well our majors are doing and give advice to dept.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Data reviewed annually by department for action, as above</td>
</tr>
</tbody>
</table>

### Examples of Changes Based on Assessment

- Two years ago, our advisory council of regional employers recommended that our majors had a good level of biological knowledge but needed stronger skills in actually conducting biological research. Data from the alumni survey also mentioned this problem. We instituted the required capstone course, which requires students to conduct original scientific research, and we asked the instructor(s) annually to report to the department on student research and communication skills demonstrated by their capstone projects. In three years, when several cohorts of majors have passed through the capstone, we will again survey alumni and employers to see whether student skills have increased, and we will review data from all years of the capstone projects.

- The capstone instructor(s) last year reported low graphing skills in seniors; we arranged with the mathematics department for greater emphasis on graphing and better assessment of graphing, in the required math course. The capstone instructor(s) will report next year whether graphing skills are stronger. Prof. Brody is currently developing a rubric to assess graphing skills more systematically in the capstone.

### Recommendations for Improving Assessment Processes

- Standardized national test is costly and time-consuming to administer, has low student motivation in its current format, and results are difficult to map to our curriculum. Committee should review usefulness of the national test.
### Appendix B: Rubrics

#### Example #1: Rubric for Senior Biology Scientific Report

by Virginia Johnson Anderson, Towson University, Towson, MD

**Assignment:** Semester-long assignment to design an original experiment, carry it out, and write it up in scientific report format. This is the major assignment in this course, titled “Scientific Research.” The course was instituted recently as a result of employer feedback that students were insufficiently prepared to really understand and carry out the scientific method. The goal of the course is to prepare students to conduct original scientific research and present it orally and in writing. There were no resources to make this a lab course, so the students had to conduct research outside the lab. Most student graduates will be working with commercial products in commercial labs in the area, e.g. Noxell. In the assignment, students are to determine which of two brands of a commercial product (e.g. two brands of popcorn) are “best.” They must base their judgment on at least four experimental factors (e.g. “% of kernels popped” is an experimental factor. Price is not, because it is written on the package).

**Rubric for Written Scientific Report**

<table>
<thead>
<tr>
<th>Section</th>
<th>5 -</th>
<th>4 -</th>
<th>3 -</th>
<th>2 -</th>
<th>1 -</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>Is appropriate in tone and structure to science journal; contains necessary descriptors, brand names, and allows reader to anticipate design.</td>
<td>Is appropriate in tone and structure to science journal; most descriptors present; identifies function of experimentation, suggests design, but lacks brand names.</td>
<td>Identifies function, brand name, but does not allow reader to anticipate design.</td>
<td>Identifies function or brand name, but not both; lacks design information or is misleading</td>
<td>Is patterned after another discipline or missing.</td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td>Clearly identifies the purpose of the research; identifies interested audiences(s); adopts an appropriate tone.</td>
<td>Clearly identifies the purpose of the research; identifies interested audience(s).</td>
<td>Clearly identifies the purpose of the research.</td>
<td>Purpose present in Introduction, but must be identified by reader.</td>
<td>Fails to identify the purpose of the research.</td>
</tr>
<tr>
<td><strong>Scientific Format Demands</strong></td>
<td>All material placed in the correct sections; organized logically within each section; runs parallel among different sections.</td>
<td>All material placed in correct sections; organized logically within sections, but may lack parallelism among sections.</td>
<td>Material place is right sections but not well organized within the sections; disregards parallelism.</td>
<td>Some materials are placed in the wrong sections or are not adequately organized wherever they are placed.</td>
<td></td>
</tr>
</tbody>
</table>
1 - Material placed in wrong sections or not sectioned; poorly organized wherever placed.

**Materials and Methods Section**

5 - Contains effective, quantifiable, concisely-organized information that allows the experiment to be replicated; is written so that all information inherent to the document can be related back to this section; identifies sources of all data to be collected; identifies sequential information in an appropriate chronology; does not contain unnecessary, wordy descriptions of procedures.

4 - As above, but contains unnecessary information, and/or wordy descriptions within the section.

3 - Presents an experiment that is definitely replicable; all information in document may be related to this section; however, fails to identify some sources of data and/or presents sequential information in a disorganized, difficult pattern.

2 - Presents an experiment that is marginally replicable; parts of the basic design must be inferred by the reader; procedures not quantitatively described; some information in Results or Conclusions cannot be anticipated by reading the Methods and Materials section.

1 - Describes the experiment so poorly or in such a nonscientific way that it cannot be replicated.

**Non-experimental Information**

5 - Student researches and includes price and other non-experimental information that would be expected to be significant to the audience in determining the better product, or specifically states non-experimental factors excluded by design; interjects these at appropriate positions in text and/or develops a weighted rating scale; integrates non-experimental information in the Conclusions.

4 - Student acts as above, but is somewhat less effective in developing the significance of the non-experimental information.

3 - Student introduces price and other non-experimental information, but does not integrate them into Conclusions.

2 - Student researches and includes price effectively; does not include, or specifically excludes, other non-experimental information.

1 - Student considers price and/or other non-experimental variables as research variables; fails to identify the significance of these factors to the research.

**Designing an Experiment**

5 - Student selects experimental factors that are appropriate to the research purpose and audience; measures adequate aspects of these selected factors; establishes discrete subgroups for which data significance may vary; student demonstrates an ability to eliminate bias from the design and bias-ridden statements from the research; student selects appropriate sample size, equivalent groups, and statistics; student designs a superior experiment.

4 - As above, but student designs an adequate experiment.

3 - Student selects experimental factors that are appropriate to the research purpose and audience; measures adequate aspects of these selected factors; establishes discrete subgroups for which data significance may vary; research is weakened by bias OR by sample size of less than 10.

2 - As above, but research is weakened by bias AND inappropriate sample size.
1 - Student designs a poor experiment.

Defining Operationally
5 - Student constructs a stated comprehensive operational definition and well-developed specific operational definitions.
4 - Student constructs an implied comprehensive operational definition and well-developed specific operational definitions.
3 - Student constructs an implied comprehensive operational definition (possible less clear) and some specific operational definitions.
2 - Student constructs specific operational definitions, but fails to construct a comprehensive definition.
1 - Student lacks understanding of operational definition.

Controlling Variables
5 - Student demonstrates, by written statement, the ability to control variables by experimental control and by randomization; student makes reference to, or implies, factors to be disregarded by reference to pilot or experience; superior overall control of variables.
4 - As above, but student demonstrates an adequate control of variables.
3 - Student demonstrates the ability to control important variables experimentally; Methods and Materials section does not indicate knowledge of randomization and/or selected disregard of variables.
2 - Student demonstrates the ability to control some, but not all, of the important variables experimentally.
1 - Student demonstrates a lack of understanding about controlling variables.

Collecting Data and Communicating Results
5 - Student selects quantifiable experimental factors and/or defines and establishes quantitative units of comparison; measures the quantifiable factors and/or units in appropriate quantities or intervals; student selects appropriate statistical information to be utilized in the results; when effective, student displays results in graphs with correctly labeled axes; data are presented to the reader in text as well as graphic forms; tables or graphs have self-contained headings.
4 - As 5 above, but the student did not prepare self-contained headings for tables or graphs.
3 - As 4 above, but data reported in graphs or tables contain materials that are irrelevant and/or not statistically appropriate.
2 - Student selects quantifiable experimental factors and/or defines and establishes quantitative units of comparison; fails to select appropriate quantities or intervals and/or fails to display information graphically when appropriate.
1 - Student does not select, collect, and/or communicate quantifiable results.

Interpreting Data: Drawing Conclusions/Implications
5 - Student summarizes the purpose and findings of the research; student draws inferences that are consistent with the data and scientific reasoning and relates these to interested audiences; student explains expected results and offers explanations and/or suggestions for further research for unexpected results; student presents data honestly, distinguishes between fact and implication, and avoids overgeneralizing; student organizes non-experimental information to support conclusion; student accepts or rejects the hypothesis.
4 - As 5 above, but student does not accept or reject the hypothesis.
3 - As 4 above, but the student overgeneralizes and/or fails to organize non-experimental information to support conclusions.
2 - Student summarizes the purpose and findings of the research; student explains expected results, but ignores unexpected results.
1 - Student may or may not summarize the results, but fails to interpret their significance to interested audiences.

Student Scores on Rubric for Science Reports

<table>
<thead>
<tr>
<th>Trait</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>2.95</td>
<td>3.22</td>
</tr>
<tr>
<td>Introduction</td>
<td>3.18</td>
<td>3.64</td>
</tr>
<tr>
<td>Scientific Format</td>
<td>3.09</td>
<td>3.32</td>
</tr>
<tr>
<td>Methods and Materials</td>
<td>3.00</td>
<td>3.55</td>
</tr>
<tr>
<td>Non-Experimental Info</td>
<td>3.18</td>
<td>3.50</td>
</tr>
<tr>
<td>Designing the Experiment</td>
<td>2.68</td>
<td>3.32</td>
</tr>
<tr>
<td>Defining Operationally</td>
<td>2.68</td>
<td>3.50</td>
</tr>
<tr>
<td>Controlling Variables</td>
<td>2.73</td>
<td>3.18</td>
</tr>
<tr>
<td>Collecting Data</td>
<td>2.86</td>
<td>3.36</td>
</tr>
<tr>
<td>Interpreting Data</td>
<td>2.90</td>
<td>3.59</td>
</tr>
<tr>
<td>Overall</td>
<td>2.93</td>
<td>3.42</td>
</tr>
</tbody>
</table>