


RUBRICS

**Teagle Foundation Systematic Improvement Grant:
Sustainable Departmental-Level Assessment of Student
Learning**

Presentation at 1/26/2010 meeting at Haverford College, with grant participants from **Bryn Mawr, Haverford, and Swarthmore Colleges**

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This summary combines speaker notes and
example slides shown during presentation.

See end for sources of examples presented.



Introduction

- Number of our projects (10 of 12) use Rubrics – Logical form of Assessment
- Presentation intended to review and establish common starting point
- Rubrics used more commonly in K-12, but less at College Level
 - Less pedagogical training?
 - Complexity of College Level work?

Rubrics operationalize student learning objectives

- A rubric is a tool for scoring an assignment that breaks the work into the component parts (which reflect objectives)
- The rubric provides a score (at a minimum) or a detailed description (ideally) of good or bad performance on each component part.
- Rubrics can be used to grade students. Each component can be weighted and combined for an overall score.
- They can be used to provide feedback about the extent to which all students are achieving each of the learning goals intended => **Assessment**.
- **Any performance assignment** can be scored with a rubric – a lab assignment, group project, oral presentation, essay, thesis, etc. (Wouldn't use for short response, multiple choice...)
- A rubric can be designed by an **individual** faculty member or by a **group** of faculty members.



Nuts and bolts

Developing a rubric (the hard part)

- 1. List the objectives** (“Broad learning targets,” “Evaluation criteria”...) and, if helpful, sub-objectives. You may see examples of rubrics that simply list skills or the component of assignment (e.g. content, presentation, organization), but in order to use rubrics for meaningful assessment of student learning for our work on the Teagle grant, the components ought to be explicitly tied to learning objectives. This articulation can be accomplished through the combination of objectives and their quality descriptions (see next item).

Nuts and bolts

Developing a rubric (the hard part)

2. Describe with examples the gradations of quality for each objective.

Usually three to five gradations are used. Use the same number of gradations for each objective, but the descriptions would, of course, be different. It can be difficult to label the gradations (Excellent, Adequate, etc.) You don't have to label them if they don't lend themselves to it – you can just use numbers or letters. ***If you have past assignments, it is helpful to review them for examples.***

- Rubric with descriptions of each level of quality.
- “Rating Scale” rubric or “Scoring” rubric– defines standard for highest level of performance, and simply uses a simple numeric rating scale (e.g. excellent, good, adequate...)

Avoid unclear language – be as specific as possible.

- Unclear objective: “uses clear language.” Better objective: “provides a detailed description “. Your descriptions in the gradations will provide further clarification



Nuts and bolts

Developing a rubric (the hard part)

3. Review, test, and adjust – work with past examples of the assignment or a similar assignment, if possible, to see whether your rubric is capturing what you want it to. Ask respected colleagues to review the rubric and ask if it makes sense or if they see any gaps

Standard Rubric

DIMENSIONS or OBJECTIVES	Label for Lowest Level	Label for Next Level	Label for Highest Level
Objective 1			
Objective 2			
Objective 3			
Objective 4			

Standard Rubric

Task Description: Each student will make a 5 minute presentation on the changes in one Portland community over the past 30 years. The student may focus the presentation in any way s/he wishes, but there needs to be a thesis of some sort, not just a chronological exposition. The presentation should include appropriate photographs, maps, graphs, and other visual aids for the audience.

DIMENSIONS or OBJECTIVES	Needs Work	Competent	Excellent
Knowledge / Understanding			
Thinking/Inquiry			
Communication			
Use of Visual Aid			
Presentation skills			

DIMENSIONS or OBJECTIVES	Needs work	Competent	Excellent
Knowledge/ Understanding	The presentation uses little relevant or accurate information, not even that which was presented in class or in the assigned texts. Little or no research is apparent.	The presentation uses knowledge which is generally accurate with only minor inaccuracies, and which is generally relevant to the student's thesis. Research is adequate but does not go much beyond what was presented in class or in the assigned text.	The presentation demonstrates a depth of historical understanding by using relevant and accurate detail to support the student's thesis. Research is thorough and goes beyond what was presented in class or in the assigned texts.
Thinking/ Inquiry	The presentation shows no analytical structure and no central thesis.	The presentation shows an analytical structure and a central thesis, but the analysis is not always fully developed and/or linked to the thesis.	The presentation is centered around a thesis which shows a highly developed awareness of historiographic or social issues and a high level of conceptual ability.
Communication	The presentation fails to capture the interest of the audience and/or is confusing in what is to be communicated.	Presentation techniques used are effective in conveying main ideas, but a bit unimaginative. Some questions from the audience remain unanswered.	The presentation is imaginative and effective in conveying ideas to the audience. The presenter responds effectively to audience reactions and questions
Use of visual aids	The presentation includes no visual aids or visual aids that are inappropriate, and/or too small or messy to be understood. The presenter makes no mention of them in the presentation.	The presentation includes appropriate visual aids, but these are too few, in a format that makes them difficult to use or understand, and/or the presenter does not refer to or explain them in the presentation.	The presentation includes appropriate and easily understood visual aids which the presenter refers to and explains at appropriate moments in the presentation.
Presentation skills	The presenter cannot be heard and/or speaks so unclearly that s/he cannot be understood. There is no attempt to engage the audience through eye contact, gestures, or body language.	The presenter speaks clearly and loudly enough to be heard, but tends to drone and/or fails to use eye contact, gestures, and body language consistently or effectively at times.	The presenter speaks clearly and loudly enough to be heard, using eye contact, a lively tone, gestures, and body language to engage the audience.

Source: <http://www.introductiontorubrics.com/index.html>

Scoring Rubric

DIMENSIONS or OBJECTIVES	DESCRIPTION OF AN EXEMPLARY PERFORMANCE	COMMENTS	Pts

Scoring Rubric

Task Description: Each student will make a 5 minute presentation on the changes in one Portland community over the past 30 years. The student may focus the presentation in any way s/he wishes, but there needs to be a thesis of some sort, not just a chronological exposition. The presentation should include appropriate photographs, maps, graphs, and other visual aids for the audience.

	Exemplary Performance	Comments	Pts.
Knowledge/ Understanding 20%	The presentation demonstrates a depth of historical understanding by using relevant and accurate detail to support the student's thesis. Research is thorough and goes beyond what was presented in class or in the assigned texts.		
Thinking/ Inquiry 30%	The presentation is centered around a thesis which shows a highly developed awareness of historiographic or social issues and a high level of conceptual ability.		
Communication 20%	The presentation is imaginative and effective in conveying ideas to the audience. The presenter responds effectively to audience reactions and questions		
Use of visual aids 20%	The presentation includes appropriate and easily understood visual aids which the presenter refers to and explains at appropriate moments in the presentation.		
Presentation skills 10%	The presenter speaks clearly and loudly enough to be heard, using eye contact, a lively tone, gestures, and body language to engage the audience.		

Collecting Data and Communicating Results - Description of Rating of 2 on 5-point scale

Vague, Unclear


Data collection is minimal and presented poorly.

Better

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.

EXAMPLE – Biology Capstone

- Department of biology. (Towson U. in MD)
- The department articulated a set of learning goals for undergraduate 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
- They had a capstone course called “Biological Research.” To evaluate student work, the teacher developed a rubric using 11 dimensions.



Biology Capstone Rubric Example

**- see spreadsheet
ExampleRubric-TowsonBiology.xls**

Biology Capstone - Scientific Report.

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).

	5	4	3	2	1
Title	Is appropriate in tone and structure to science journal; contains necessary descriptors,	Is appropriate in tone and structure to science journal; most descriptors present; identifies function of experimentation, suggests design, but lacks brand names.	Identifies function, brand name, but does not allow reader to anticipate design.	Identifies function or brand name, but not both; lacks design information or is misleading	Is patterned after another discipline or missing.
Introduction	Clearly identifies the purpose of the research; identifies interested audiences(s); adopts an appropriate tone.	Clearly identifies the purpose of the research; identifies interested audience(s).	Clearly identifies the purpose of the research.	Purpose present in Introduction, but must be identified by reader.	Fails to identify the purpose of the research.
Scientific Format Demands	All material placed in the correct sections; organized logically within each section; runs parallel among different sections.	All material placed in correct sections; organized logically within sections, but may lack parallelism among sections.	Material placed in right sections but not well organized within the sections; disregards parallelism.	Some materials are placed in the wrong sections or are not adequately organized wherever they are placed.	Material placed in wrong sections or not sectioned; poorly organized wherever placed.
Materials and Methods Section	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.	As {5}, but contains unnecessary information, and/or wordy descriptions within the section.	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.	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.	Describes the experiment so poorly or in such a nonscientific way that it cannot be replicated.

Non-experimental Informatin	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 nonexperimental information in the Conclusions.	Student acts as {5}, but is somewhat less effective in developing the significance of the non-experimental information.	Student introduces price and other non-experimental information, but does not integrate them into Conclusions.	Student researches and includes price effectively; does not include, or specifically excludes, other non-experimental information.	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	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.	As {5}, but student designs an adequate experiment.	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.	As {3}, but research is weakened by bias AND inappropriate sample size.	Student designs a poor experiment.
Defining Operationally	Student constructs a stated comprehensive operational definition and well-developed specific operational definitions.	Student constructs an implied comprehensive operational definition and well-developed specific operational definitions.	Student constructs an implied comprehensive operational definition (possible less clear)and some specific operational definitions.	Student constructs specific operational definitions, but fails to construct a comprehensive definition.	Student lacks understanding of operational definition.
Controlling Variables	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.	As {5}, but student demonstrates an adequate control of variables.	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.	Student demonstrates the ability to control some, but not all, of the important variables experimentally.	Student demonstrates a lack of understanding about controlling variables.

<p>Collecting Data and Communicating Results</p>	<p>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.</p>	<p>As {5}, but the student did not prepare self-contained headings for tables or graphs.</p>	<p>As {4}, but data reported in graphs or tables contain materials that are irrelevant and/or not statistically appropriate.</p>	<p>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.</p>	<p>Student does not select, collect, and/or communicate quantifiable results.</p>
<p>Interpreting Data: Drawing Conclusions/ Implications</p>	<p>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 nonexperimental information to support conclusion; student accepts or rejects the hypothesis.</p>	<p>As {5}, but student does not accept or reject the hypothesis.</p>	<p>As {4}, but the student overgeneralizes and/or fails to organize non-experimental information to support conclusions.</p>	<p>Student summarizes the purpose and findings of the research; student explains expected results, but ignores unexpected results.</p>	<p>Student may or may not summarize the results, but fails to interpret their significance to interested audiences.</p>



Applying a rubric (the easy part)

1. For your own records, create a **summary sheet that identifies the objectives across the top, and the students' names down the side**. This is where you will record the scores. This can be a paper sheet, but some may find it easier to use an electronic spreadsheet to make it easier to work with the results later on.



Applying a rubric (the easy part)

2. With the full rubric (including descriptions and examples) in front of you **score** each student's work on each of the objectives, using the criteria you defined, recording the scores on the summary sheet. Though you may have used labels or letters for each gradation of quality, you may want to translate these to numbers in recording the scores in order to more easily quantify success on each objective.

Recording Rubric Scores


	Knowledge / Understanding	Thinking/ Inquiry	Communication	Use of Visual Aid	Presentation Skills
Student 1					
Student 2					
Student 3					
Student 4					
Student 5					
...					
Student n					

Applying a rubric (the easy part)

3. Your summary sheet can be used (with weighting if you'd like) to generate an overall score for each student, which you can use in grading. But for assessing student learning objectives, the **target for summary is each objective**. The summary for each objective can be in any form that is meaningful to you – a percentage of students achieving each level of quality, an average score, etc. It is useful to summarize in multiple ways so that you get a good sense of how students are doing in general, and also the range of performance.


Recording Rubric Scores

	Knowledge / Understanding	Thinking/ Inquiry	Communication	Use of Visual Aid	Presentation Skills	TOTAL for STUDENT
Student 1						Grades
Student 2						
Student 3						
Student 4						
Student 5						
...						
Student n						
TOTAL for DIMENSION	Assessment					




Closing the loop - applying what you've learned (the most important part)

- The results from step 3 will show you the specific areas in which your students are doing well or need improvement.
- Return to your teaching strategies to consider appropriate improvements



Biology Example - Scoring showed a weakness in experimental design, and so department added emphasis to this in the curriculum.

- The department instituted the annual meeting.
- At the meeting, the capstone teacher(s) reported students strengths and weaknesses, using rubric scores. They also considered other evidence.
- The department decided to focus on students' ability to design experiments.



EXAMPLES in real life ... at Swarthmore.

These are not examples of using rubrics for assessment in the way we will for our Teagle projects, but just some reactions and comments from instructors who have found them to be useful tools in grading.



Ellen Magenheim, Professor of Economics, Chair of original Assessment Planning Committee, champion of assessment

- As an advocate of assessment, give it a try: Health Economics class – a designated “Writing” course.
- Has students write an Op-Ed before 1st class (NYT guidelines). Repeats assignment at end and compares content, analysis, and writing.
- After first one, continue to refine and revise.
 - Found it to be very useful
 - Find it difficult to capture everything - how to identify qualities like writing that's exciting?
 - Has not yet used it to assess course learning goals.
 - Has not shared it with students; still more a tool for organizing thoughts



Dominic Tierney, Assistant Professor of Political Science

- Wanted to make grading more efficient and effective, and provide simple feedback for repetitive types of comments.
- Gives sheet to student along with additional individualized comments.
- Does not compile a master sheet – grade isn't a systematic function of scores, but there is likely a correlation.
- Shares with students in advance.
- “Builds confidence.” “Real Motivator.”

"Grading Sheet"

Dominic Tierney, Asst. Prof, Political Science
Swarthmore College

	Inadequate critical thinking	Some critical thinking, but more engagement needed	Fair critical thinking	Strong critical thinking	Excellent critical thinking
	Writing is poor; often unclear; several more drafts needed	Writing is patchy; considerable unclear sections	Fair writing; some sections unclear	Strong writing	Excellent writing
	Inadequate research	Too few sources used; more careful research needed	Fair research; more sources would be useful	Strong research and range of sources	Excellent research and range of sources
	Unacceptable number of spelling and grammar errors	Considerable spelling and grammar errors	Fair presentation, but needs more proof-reading	A couple of spelling and grammatical errors	Almost flawlessly presented

“Grading Sheet” -> Rubricized
 Dominic Tierney, Asst. Prof, Political Science
 Swarthmore College

	Inadequate	Poor	Fair	Strong	Excellent
Critical Thinking	Inadequate critical thinking	Some critical thinking, but more engagement needed	Fair critical thinking	Strong critical thinking	Excellent critical thinking
Quality of Writing	Writing is poor; often unclear; several more drafts needed	Writing is patchy; considerable unclear sections	Fair writing; some sections unclear	Strong writing	Excellent writing
Research	Inadequate research	Too few sources used; more careful research needed	Fair research; more sources would be useful	Strong research and range of sources	Excellent research and range of sources
Spelling/ Grammar	Unacceptable number of spelling and grammar errors	Considerable spelling and grammar errors	Fair presentation, but needs more proof-reading	A couple of spelling and grammatical errors	Almost flawlessly presented

Challenges

- If you use the rubric to assign grades, be aware that some instructors sometimes report a gap between the resulting score from the rubric and what the instructor feel the student has earned. => Something is not being accounted for in the rubric.
- Balance – need to find a balance between detail and usability. W. James Popham, UCLA: Rubric “should guide ..., not overwhelm.”
- The rubric must be very well-designed in order for the results to be useful. You need to put in a lot of quality time at the front end, or else it may be a waste of time.



Sharing with Students

Consider sharing the rubric with your students

1. Makes expectations clear
2. Allows students to assess themselves – some evidence that this leads to improved learning

Advantages to students and to you

3. Improves consistency in grading
4. Improves speed of grading



If you do share...

If you will be providing detailed feedback to students based on the rubric (e.g. if you have shared the rubric with them) you should create a summary sheet for each student that shows the objective, provides a space to show the quality level you've assigned their performance on that objective, and a place for additional comments.

Sources

- Andrade, H. G. *Using Rubrics to Promote Thinking and Learning*. Educational Leadership, Volume 57 Number 5 February 2000
<http://learnweb.harvard.edu/ALPS/thinking/docs/rubricar.htm>
 - Popham, W. J. (1997) *What's Wrong – and What's Right – with Rubrics*. Educational Leadership, Volume 55 Number 2 October 1997.
 - Stevens, D. D. & Levi, A. J. (2005) *Introduction to rubrics: An assessment tool to save grading time, convey effective feedback and promote student learning*. Stylus Publishing LLC. Sterling, Virginia. Summarized on publisher's website at
<http://www.styluspub.com/resources/introductiontorubrics.aspx>
and at <http://www.introductiontorubrics.com/index.html>
- Walvoord, B. E. (2004) *Assessment Clear and Simple: A Practical Guide for Institutions, Departments, and General Education*. Jossey-Bass Higher and Adult Education, San Francisco, CA.
- **Examples presented:**
Some examples were adapted from Stevens, D. D. & Levi, A. J. (above); Biology capstone example by Virginia Johnson Anderson, Towson University, Towson, MD, reported in Walvoord and Anderson, *Effective Grading: A Tool for Learning and Assessment, 1998*, pp. 197-201, 147. Some basic examples from
<http://www.introductiontorubrics.com/samples.html>.