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## Creating Rubrics

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## Workshop Outcomes

Workshop participants will be able to:

- Differentiate between checklists, performance lists, and rubrics as used in the assessment of student performance
- Describe the uses and limitations of holistic and analytic rubrics
- Construct an initial draft of a rubric

How many of you can already do all three? Two of them?



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## Why Rubrics?

- Clarify complex, hard to define learning outcomes such as critical thinking, creativity, ...
- Provide valid and reliable assessment of student learning of these same outcomes
- Improve student motivation and achievement by modeling quality performances and products



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## Common difficulties encountered in assessment ...

- Gaining efficiencies without losing effectiveness
- Trying to simplify what is complex
- Achieving a common understanding





## Two Basic Types of Direct Measures

- Selected response
- Constructed response



## Selected Response

- Examples
 

Multiple choice	True/false
Matching	Listing
Short Answer	
- Advantages
  - Efficient for assessing factual information, basic concepts, and simple skills
  - Quick scoring



## Selected Response

- Limitations
  - Poor for assessing higher order skills (adapt, create, analyze, evaluate, synthesize, etc)
  - Poor for assessing student's ability to apply knowledge and skills



## Constructed Response

- Examples
 

Essays	Oral Presentations
Oral Exams	Demonstrations
Exhibitions	Performances
Products	Research papers
Poster presentations	Capstone projects
Practical exams	Supervised internships & practicums



## Constructed Response

- Advantages
  - Assess student's ability to use knowledge and skills to answer a question, produce a product, or demonstrate ability to perform
  - Authenticity
- Limitations
  - Can't use a simple answer key
  - Consistency in rating
  - Need clear, specific, and measurable criteria for identifying performance levels



## Which is better – selected or constructed response?

It depends(!) on the student learning outcome

- Describe the scientific method
- Apply knowledge and skills from multiple, diverse disciplines and practical experiences to understand complex issues and to solve problems
- Communicate effectively
- Develop significant theses and support them well
- Demonstrate competence in the use of Microsoft Word, Excel and Front Page



## What is a rubric?

- Devices for organizing and interpreting data gathered from observations or artifacts of student learning
- Instruments that attempt to make subjective measurements as objective, clear, consistent and as defensible as possible
- Explicit definitions of the criteria on which performance or achievement is judged
- Permit differentiation between levels of achievement or development



## Clear Performance Criteria Benefit Instructors and Students

- Shows what you want the students to learn
- Demonstrates to the student and others what your performance expectations are
- Increases student engagement in their own learning
- Fosters the life-long learning skill of self-assessment
- Helps students provide peers with constructive feedback on drafts
- Increases consistency and fairness in the grading process
- Saves instructor time during the grading process and in having to respond to student questions about how they ended up with the grade that they were given
- Identifies relationship between discipline information and process
- Helps to connect tests and assignments to student learning outcomes and the assessment process

Walvoord & Anderson (1998) Effective Grading: A Tool for Teaching and Learning



## Checklist, Performance List or Rubric?



## Checklist

- Listing of required elements of a performance or product
- Score is assigned based on whether the element is present or not
- Useful for assessing simple performances or achievement in which dichotomous types of judgments are to be made



## Checklist Example

- Peer assessment of group work. One criterion is participation in group problem solving.

Participates in group problem solving	<input type="checkbox"/> Yes (1 pt) <input type="checkbox"/> No (0 pt)
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- What is missing?
  - Quality?
  - What does “participate” mean?
  - Partial performance?



## Performance List

- Listing of required elements of a performance or product
- Quality dimension added through use of some kind of scaled scoring system
- Provides more scoring flexibility
  - Point values used in the scale (1 to 3; 1 to 5)
  - Weighting of the elements



## Performance List Example

- Peer assessment of group work. One criterion is participation in group problem solving.

Participates in group problem solving	Outstanding 3	Satisfactory 2	Tolerable 1	Unsatisfactory 0
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- What is missing?
  - Criteria and indicators that explain the difference between the levels of performance (“Outstanding” and “Satisfactory”, etc)



## Rubric

- Scale of possible points to be assigned based on a continuum of quality or achievement
- List of criteria with descriptors of the characteristics of the product or performance for each score point (criterion-referenced)



## Rubric Example

- Peer assessment of group work. One criterion is participation in group problem solving.

Criteria	Outstanding <b>3</b>	Satisfactory <b>2</b>	Tolerable <b>1</b>	Unsatisfactory <b>0</b>
Participates in group problem solving	Actively looks for and suggests solutions to problems	Does not actively look for solutions; participates in the refining of solutions suggested by others	Does not suggest solutions; does not participate in refinement of solutions suggested by others, is willing to try out solutions suggested by others	Does not try to solve problems, does not help others solve problems; unwilling to try solutions suggested by others; does not provide any assistance



## Types Rubrics

- Holistic
  - Single score or rating for an entire product or performance based on an overall impression of a student’s work
- Analytical
  - Divides a product or performance into essential traits, components, or dimensions so that they can be judged separately
  - Each component receives a separate score and various components can be weighted according to importance



## Holistic or Analytical?

### Holistic

- Use
  - For quick snapshot of overall performance
  - When speed is more important than precision
  - Simpler products or performances
- Limitations
  - Two students may get same score for very different reasons
  - Not as good for identifying strengths and weaknesses
  - Not as useful for students to use

Source: Arter & McTighe, 2001

### Analytical

- Use
  - When teaching students the nature of quality work or self assessment
  - For providing detailed feedback
  - When precisely describing quality is more important than speed
  - When several dimensions are necessary for clarity about achievement of complex skills, products or performances
- Limitations
  - Slower scoring
  - Takes longer to learn



## Examples of Rubrics

1. Framing & Resolving Ill-Defined Problems (holistic)
2. Critical Thinking (holistic)
3. Student Friendly Writing Rubric (analytical)
4. Generic Essay Scoring Guide (holistic)
5. Information Literacy (analytical)
6. Peer Evaluation of Group Work (analytical)



## Rubric Construction



## A 10 Step Approach

1. Identify performance, process or product to be rated
2. Determine the essential elements, components or features that are necessary to differentiate between high and low achievement
3. Choose a rubric type (holistic, analytical)
4. Decide on the number of levels of achievement
5. For each essential element, describe the upper level of performance



## A 10 Step Approach

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6. Repeat describing the lower level of performance
7. Repeat as needed to describe the intermediate levels of performance
8. If analytical, determine whether scores for various elements should be weighting
9. Share with colleagues and/or students and gather feedback
10. Pilot and refine



## 1. Identify performance, process or product to be rated

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- Student learning outcomes
- Assignment



## 1. Identify performance, process or product to be rated

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- Example
  - Outcome - students are able to apply empirical reasoning to resolve questions
  - Assignment/Assessment method – BIOL 314 research report



## 2. Determine the essential elements, components or features that are necessary to differentiate between high and low achievement

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- Guided by student learning outcome
- Each element should be important, measurable, and feasible
- Broad types of elements to consider
  - Impact - was the work effective?
  - Craftsmanship - was the product or performance of high quality?
  - Adequacy of Process & Behaviors – what was the quality of the procedures and manner of presentation, prior to and during performance?
  - Aptness of Content – was the content valid?
  - Degree of mastery – was the work sophisticated?



## 2. Determine the essential elements, components or features that are necessary to differentiate between high and low achievement

- Don't over-emphasize *content, format* and *conventions* while under-emphasizing *impact* and *methods*
- After identifying the main elements, consider whether there are particular demands that require additional, task-specific criteria
- Example: Students will be able to write effectively

Engaging	Focused
Mindful of audience	Effective voice
Clear	Punctuation & grammar



## 2. Determine the essential elements, components or features that are necessary to differentiate between high and low achievement

- Example
  - Clearly describes methods and materials
  - Controls variables
  - Effectively collects data and communicates results
  - Interprets data correctly in drawing conclusions



## 3. Choose a rubric type (holistic, analytical)

- Efficiency vs. effectiveness
  - Holistic rubrics tend to be quicker and easier to write and use
  - Analytical rubrics tend to give better feedback and more valid results
- Regardless of type, a good rubric must cover all of the essential components of the product or performance



## 4. Decide on the number of levels of achievement

- Typically between 3 and 7 (try starting with 4 to 6)
- Select descriptors
  - Exemplary...Good...Satisfactory...Needs Improvement
  - Exemplary...Accomplished...Developing...Beginning
  - Excellent...Good...Needs Work
  - Advanced...Proficient...Partially Proficient...Not Proficient
  - Exceeds Expectations...Meets Expectations...Does Not Meet Expectations



#### 4. Decide on the number of levels of achievement

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- Example
  - Analytical rubric
  - 4 essential elements
  - 4 levels of achievement (Excellent, Good, Almost There, Needs Work)



#### 5. For each essential element, describe the upper level of performance

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- Sufficiently generic for general goals beyond the specific task but specific enough to be useful in measuring the task
- What are the central features of performance – not what is easiest to see, count or score
- Use descriptive language (what does high quality look like?) that are sufficiently rich to allow students to use for self-assessment
- When possible, include indicators that reveal that the performance criterion is being met



#### Criteria and Indicators

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- Criteria
  - General description of what is required
- Indicators
  - Provide specific examples that the criterion is being met
  - Suggest that criterion is being met but not foolproof nor appropriate in depending on context
  - Clues the performer and rater can use to identify achievement level



#### 5. For each essential element, describe the upper level of performance

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- May find it helpful to identify the attribute or underlying characteristic of each performance criteria

Depth	Breadth	Quality
Scope	Extent	Complexity
Degrees	Accuracy	Relevance
Clarity	Organization	Autonomy
Attention	Consistency	Fluency
Impact	Method	



### 5. For each essential element, describe the upper level of performance

• Example

Excellent (5)	
<b>Methods and Materials Section</b>	Report 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 sequential information in an appropriate chronology; does not contain unnecessary, wordy descriptions of procedures.
<b>Controlling Variables</b>	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.



### 5. For each essential element, describe the upper level of performance

- Stumped?
  - Obtain previous performance samples; sort into groups (high to low), write down reasons why work was sorted as it was, cluster reasons into essential elements or dimensions
  - Real world expectations
  - Expert opinion (yours!)
  - Collaborate with students
  - Adopt and adapt
- Unless format or style is important, try not to limit performance or creativity
- Goal is to make clear what expectations must be met, no matter how diverse the performance, to be excellent



### 6. Repeat describing the lower level of performance

- Try not to simply describe in terms of deficits especially when used as a teaching tool or developmental aid
- What is accomplished even at the lowest level?



### 6. Repeat describing the lower level of performance

• Example

Needs Work (1)	
<b>Methods and Materials Section</b>	While a description is provided within the report, it is not detailed enough to permit an replication of the study.
<b>Controlling Variables</b>	Written information within the report indicates only a few of the important variables have been controlled for experimentally.



### 7. Repeat as needed to describe the intermediate levels of performance

- Concept words that convey various degrees of performance

Always to usually to  
sometimes to seldom  
Presence to absence

Major to minor

Complete to incomplete

Presence to absence

Major to minor

Extremely to mainly to  
moderately to slightly  
Many to some to none

Consistent to inconsistent

All to most to some to few

Many to some to none

Always to generally to  
sometimes to rarely



### 7. Repeat as needed to describe the intermediate levels of performance

- Okay to revise the number of levels you initially set in Step 4 if it proves too difficult to devise distinctions between high and low performance



### 8. If analytical, determine whether scores for various elements should be weighting

- Are some elements more important than others?
- Developmental expectations



### 9. Share with colleagues and/or students and gather feedback

- Are all of the necessary elements included?
- Are there any non-essential elements?
- Are the performance descriptors:
  - Clear?
  - Objective?
  - Specific?
  - Consistent?
- Are the gaps between score points consistent and equal?



## 10. Pilot and refine

- Does it allow you to distinguish between levels of performance?
- Multiple versions – instructor, student
- Never perfect - don't let that stop you from beginning!
- Can you adopt or adapt a rubric for a course assignment as a course-embedded assessment instrument for your academic major's student learning outcomes?
- Multiple reviewers? Check inter-rater reliability



## Converting Rubric Scores to Grades

- Don't add up all of the points earned and divide by the number of points possible to get a percentage.
- Develop a logic rule for converting score descriptions into a grade associated with a performance standard



Source: Arter & McTighe, 2001



## Example of Logic Rules

Rule	Grade
No more than 10% of scores lower than a 4, with at least 40% 5s	A
No more than 30% of scores lower than a 4, with at least 10% 5s	B
No more than 10% of scores lower than a 3, with at least 20% 4 or better	C
No more than 30% of scores lower than a 3, with at least 10% 4 or better	D
Anything lower than this	F

Source: Arter & McTighe, 2001



## Learner-Centered



- Hand out rubric with assignment so students will know your expectations
- When used for grading, return rubric with the grading on it (saves time in writing extensive comments)
- Develop a rubric with your students for an assignment or group project
- Have students try a rubric with samples of work before they create their own
- Have students use rubrics for peer assessment of work
- Have students self assess their ownwork using the rubric and include their assessment with their product
- Have students compare their self assessment against faculty assessment



## A Show of Hands...



Do you think you can:

- Differentiate between checklists, performance lists, and rubrics as used in the assessment of student performance?
- Describe the uses and limitations of holistic and analytic rubrics?
- Construct an initial draft of a rubric?