Program Assessment
A Primer for
Air University
Faculty and Staff

A Publication of the
Air University
OFFICE OF ACADEMIC AFFAIRS

Contents

Defining Programmatic Student Learning Outcomes

Air University is designated as a Level 5 institution by the Southern Association of Colleges and Schools Commission of Colleges (SACSCOC), as it has three or fewer doctoral level programs at this time. At the heart of Air University is its mission:

Educate and develop Air, Space, and Cyberspace warrior leaders ISO the National Defense Strategy.

Thus, Air University is committed to providing quality educational programs as its responsibility to each student and the United States Air Force (USAF). Air University's assessment is aligned to the Department of Defense and USAF guidance such as CJCSI 1800.01F, Officer Professional Military Education Policy, 15 May 2020; CJCSI 1805.01B, and Enlisted Professional Military Education Policy, 15 May 2015. Further, Air University meets the SACSCOC Core Requirement 8.

> "The institution identifies, evaluates, and publishes goals and outcomes for student achievement appropriate to the institution's mission, the nature of the students it serves, and the kinds of programs offered. The institution uses multiple measures to document student success" (Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), 2020, pp. 64-70).

Learning Outcomes are statements which clearly articulate the expected knowledge, skills, attitudes, competencies, and habits of mind that students are expected to acquire from an educational experience. Transparent student learning outcomes statements are:

- Specific to institution-level, program-level, or course level

- Clearly expressed and understandable by multiple audiences

- Prominently posted or linked to multiple places across the website

- Updated regularly to reflect current outcomes

- Receptive to feedback or comments on the quality and utility of the information provided

(National Institute for Program Outcomes Assessment, 2021).

When the learning outcomes, curriculum, instructional methodology, and assessment align within an assessment system, the use of the assessment results needs to be considered within the broad context of the learning outcomes, curriculum, instructional methodology, and assessment (Miller & Brophy, 2019). Adjustments to any of these components would be a reasonable use of results. When examining assessment results, and considering the next steps, it could include any of all the components in Figure 1. The remainder of the primer will focus on this process. For additional information and resources, please visit the Institutional Effectiveness Team's Channel in Office 365.

Figure 1: The Assessment Process
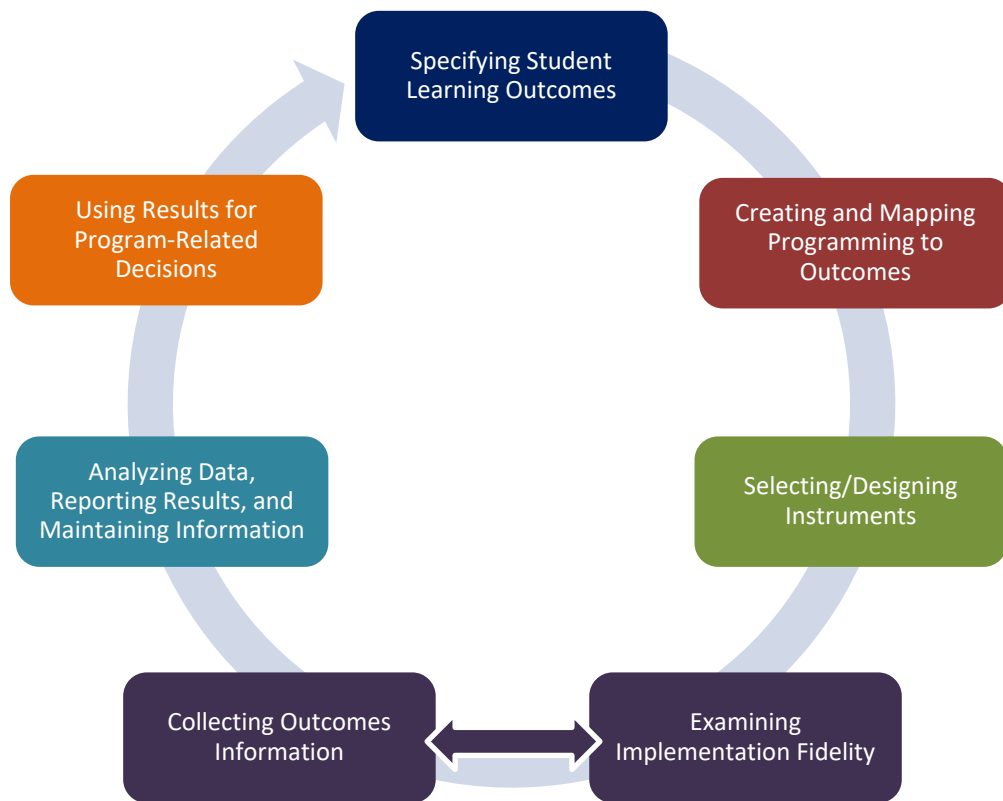
Course, Program, or Institutional Level Student Learning Outcomes

Course student learning outcomes (CLOs) are typically the responsibility of the faculty, course directors. CLOs describe the broadest goals for the course, ones that require higher-level thinking abilities; require students to synthesize many discreet skills or areas of content; ask them to then produce something - papers, projects, portfolios, demonstrations, performances, artworks, exams, etc., – that applies what they have learned; and require faculty to evaluate or assess the product to measure a student's achievement or mastery of the outcomes. The assessment of PLOs is useful in helping professors know where their teaching and learning activities have and have not been successful. PLOs also let students know what they can expect to attain as a result of completing the course.

Program student learning outcomes (PLOs) are typically the responsibility of the program coordinator or the dean. PLOs are defined as the knowledge, skills, abilities, or attitudes that students have at the completion of a degree or certificate. Faculty within a discipline should meet to discuss the expected learning outcomes for students who complete a particular series of courses, such as those required for a certificate or a degree. It is recommended that a program have 3-6 identified PLOs.

Institutional student learning outcomes (ILOs) are the core competencies that all students who attend a program at Air University are expected to develop.

Through the templates and attachments provided in the Omnibus, the alignment between CLOs, PLOs, and ILOs roll up to depict the learning that occurs at Air University. For a template on Air University Requirements and Standards Crosswalk, refer to Attachment 4 in AUI 36-2602. For an in-depth discussion regarding the levels of assessment, refer to *Levels of assessment: From the student to the institution* (Miller & Leskes, 2005).

Figure 2: Example of Levels of Assessment
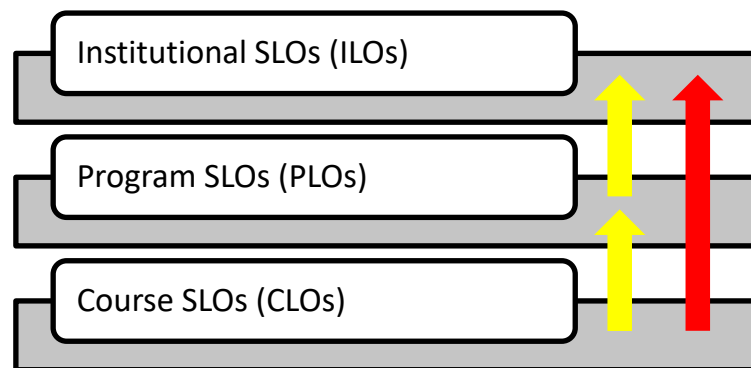
Three Critical Components of a PLO
1. Recency – What are the most important knowledge or skills that I want my students to attain by the end of their program? Does this knowledge or skill reflect the current knowledge and practice in the field?
2. Relevance – is the degree to which the outcome relates logically and significantly to the discipline.
3. Rigor – How will I know when my students have met the stated outcome in a precise and thorough way that demonstrates success?

Components of Writing an Effective PLO
1. Focus on what the student will know and be able to do. All disciplines have a core knowledge set that must be learned, as well as application of that knowledge in a professional environment. When writing an effective knowledge PLO, consider beginning with one of the following types of phrases (For a more complete list of suggestions, please refer to the Taxonomy Table):
    a. Students know
    b. Students identify
2. When writing an effective PLO reflecting what students are able to do, consider beginning with one of the following types of phrases:
    a. Students analyze
    b. Students evaluate

3. Describe observable and measurable actions or behaviors. Measurement tools may vary. Faculty may use quizzes, tests, portfolios, rubrics, and capstone projects etc…
4. AVOID verbs and phrases that are internalized and not observable; for example,
   - Understand
   - Appreciate
   - Become familiar with
   - Learn about, think about
   - Become aware of, gain an awareness of
   - Demonstrate the ability to
5. Two key questions:
   - Are the PLOs clear? If not, rephrase for clarity.
   - Do the PLOs align with the curriculum, instructional methodology, and assessment? If not, adjust components accordingly (Miller & Brophy, 2019).

Suskie (2009) contends that while these types of nebulous phrases are fuzzy, being too specific narrows the scope of your outcome. The best PLOs are those that fall in between (p. 130):

Too vague:	Students will demonstrate information literacy skills.
Too specific:	Students will be able to use the college's online services to retrieve information.
Better:	Students will locate information and evaluate it critically for its validity and appropriateness.

Bloom's Taxonomy (1956) is the best known framework for articulating learning goals. Bloom's has three domains of learning: cognitive, affective (attitudinal), and psychomotor (physical). The cognitive domain has six levels of progression of knowledge and intellectual skills: knowledge, comprehension, application, analysis, synthesis, and evaluation. Bloom's taxonomy was updated by Anderson and Krathwohl (2001) to reverse the synthesis and evaluation categories and relabeled "synthesize" to "create," refer to Figure 3 and Tables 1-4.

Figure 3. The Taxonomy Table

The Knowledge Dimension	The Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge						
Procedural Knowledge						
Meta-Cognitive Knowledge						

Anderson, L. W. & Krathwohl, D. R. (2001).

Table 1. The Knowledge Dimension – Bloom's Revised Taxonomy

Major Types and Subtypes	Examples
A. Factual Knowledge – The basic information that a student must know to be familiar with a discipline or to solve a problem in it.	
a. Knowledge of Terminology	Technical vocabulary and symbols
b. Knowledge of specific details and elements	Major natural resources, reliable sources of info.
B. Conceptual Knowledge – The interrelationships among the basic elements within the larger structure working together.	
a. Knowledge of classification and categories	Forms of business ownership, periods of historical times
b. Knowledge of principles and generalizations	Law of supply and demand, laws of gravity
c. Knowledge of theories, models, and structures	Evolution theory, structure of Congress
C. Procedural Knowledge – How to do something.	
a. Knowledge of subject-specific skills and algorithms	Whole number division algorithms, skills used in painting with acrylics
b. Knowledge of subject-specific techniques and methods	Interviewing techniques in counseling, scientific method
c. Knowledge of criteria for determining when to use appropriate procedures	Criteria to determine which research method to use for a research project
D. Metacognition – general knowledge of cognition and the knowledge of one's own cognition.	
a. Strategic knowledge	Knowledge of particular study skills that work best for one's own self; for example, outline a chapter
b. Knowledge of cognitive tasks, including appropriate contextual and conditional knowledge	Knowledge of the cognitive demands required of different tasks
c. self-knowledge	Awareness of one's own knowledge level

Anderson, L. W., & Krathwohl, D. R. (2001).

Table 2. The Cognitive Process Dimension– Bloom's Revised Taxonomy

Categories and Cognitive Processes	Alternate Names	Definitions and Examples
1. Remember: Retrieve relevant information from ling-term memory		
Recognition	Identifying	Locating knowledge in long-term memory that is consistent with presented material (e.g., Recognize the dates of important events in US History.)
Recalling	Retrieving	Retrieving relevant knowledge from long-term memory (e.g., Recall the dates of important events in US History).
2. Understand – Construct meaning from instructional messages, including oral, written, and graphic communication		
Interpreting	Clarifying, paraphrasing, representing, translating	Changing from one form of representation (e.g., numerical) to another (e.g., verbal, graphical)
Exemplifying	Illustrating, instantiating	Finding a specific example or illustration of a concept or principle (e.g., give examples of various artistic painting styles)
Classifying	Categorizing, subsuming	Determining that something belongs to a category (e.g., concept or principle; classifying mental disorders)
Summarizing	Abstracting, generalizing	Abstracting a general theme or major pint(s) (e.g., write an essay about a video documentary)
Inferring	Concluding, extrapolating, interpolating, predicting	Drawing a logical conclusion from presented information (e.g., infer grammatical principles to a new language)
Comparing	Contrasting, mapping, matching	Detecting correspondences between two ideas, object, of the like (e.g., compare historical events to contemporary situations)
Explaining	Constructing models	Constructing a cause-and-effect model of a system (e.g., construct the causes of important events during the Civil War)
3. Apply – Carry out or use a procedure given a situation		
Executing	Carrying out	Applying a procedure to a familiar task (e.g., divide one whole number by another whole number)
Implementing	Using	Applying a procedure to an unfamiliar task (e.g., use Newton's s Second Law when appropriate)

Categories and Cognitive Processes	Alternate Names	Definitions and Examples
4. Analyze – Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose		
Differentiating	Discriminating, distinguishing, focusing, selecting	Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material (e.g., relevant and irrelevant information within a word problem)
Organizing	Finding, coherence, integrating, outlining, parsing, structuring	Determining how elements fir or function within a structure (e.g., structure evidence in a historical description into evidence for and against a particular historical explanation)
Attributing	Deconstructing	Determine a point of view, bias, values, or intent underlying presented material (e.g., political persuasion of a newspaper article)
5. Evaluate- Make judgments based on criteria and standard		
Checking	Coordinating, detecting, monitoring, testing	Detecting inconsistencies or fallacies within a process or product; determining whether a process or product has internal consistency; detecting the effectiveness of a procedure as it is being implemented (e.g., determine if a scientist's conclusions follow from observed data)
Critiquing	Judging	Detecting inconsistencies or fallacies between a product and external criteria; determining whether a product has external consistency; detecting the appropriateness for a given problem (e.g., judge which of two methods is best to solve a given problem)
6. Create – Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure		
Generating	Hypothesizing	Coming up with alternative hypotheses based on criteria (e.g., generate hypotheses to account for an observed phenomenon)
Planning	Designing	Devising a procedure for accomplishing some task (e.g., plan a research paper on a given historical topic)
Producing	Constructing	Inventing a product (e.g., build habitats for a specific purpose)

Anderson, L. W., & Krathwohl, D. R. (2001).

Table 3. Verbs for Bloom's Taxonomy

Remember	Understand	Apply	Analyze	Evaluate	Create
Arrange	Classify	Apply	Analyze	Agree	Adapt
Choose	Compare	Appraise	Assume	Appraise	Arrange
Copy	Contrast	Build	Categorize	Argue	Assemble
Define	Defend	Choose	Change	Assess	Build
Describe	Demonstrate	Calculate	Classify	Award	Change
Find	Describe	Contrast	Combine	Choose	Choose
How	Discuss	Construct	Compare	Compare	Combine
Identify	Explain	Classify	Conclusion	Conclude	Compile
Label	Extend	Criticize	Contrast	Criteria	Compose
List	Identify	Diagnose	Diagram	Criticize	Construct
Locate	Indicate	Estimate	Discover	Critique	Create
Name	Infer	Experiment with	Dissect	Decide	Delete
Quote	Interpret	Identify	Distinguish	Deduct	Design
Recall	Illustrate	Interview	Divide	Defend	Develop
Recite	Organize	Illustrate	Examine	Determine	Devise
Repeat	Paraphrase	Interpret	Figure	Disprove	Discuss
Select	Relate	Make use of	Find	Estimate	Elaborate
State	Reorganize	Model	Function	Evaluate	Estimate
What	Rephrase	Organize	Inference	Explain	Formulate
When	Show	Plan	Inspect	Importance	Invent
Where	Summarize	Select	List	Influence	Manage
Which	Transform	Solve	Modify	Interpret	Minimize
Who	Translate	Utilize	Motive	Judge	Modify
Why	Report		Predict	Justify	Original
	Restate		Relationships	Marl	Originate
	Review		Sketch	Measure	Organize
	Rewrite		Simplify	Opinion	Plan
			Solve	Perceive	Predict
			Survey	Predict	Prepare
			Take part in	Prove	Produce
			Test for	Qualify	Propose
			Theme	Rate	Set up
				Recommend	Solve
				Rule on	Test
				Select	Verify
				Support	
				Value	
				Qualify	
				Rate	
				Recommend	
				Support	

Anderson, L. W., & Krathwohl, D. R. (2001).

Table 4. Examples of Effective PLOs

Geography	Identify and examine the social, cultural, and economic concepts from spatial and regional perspectives.
Biology	Propose and deploy scientific methods to solve problems and generate new information
Social Work	Students will summarize methods for analyzing assessment results and prioritizing client needs.
Education (doctoral)	Articulate and defend, orally and in writing, the results of their research and scholarship.

Program Goals Versus Program Student Learning Outcomes

Program Goals include the broad educational goals of a program or unit and programmatic elements such as, but not limited to the following:

- Total students enrolled
- Total students who pass an outside certification or licensure test
- Percentage of minority students
- Total number of students enrolled in remedial courses
- Percentage of those accepted to a program from those who applied
- Percentage of those who matriculated from those admitted
- Median time to degree
- Percent attrition rate
- Percent completion rate
- Number of graduates
- Post-graduation employment
- Post-graduation acceptance to a professional school or degree advancement

The data produced from Program Goals are **outputs, not outcomes.** Outputs describe and count what we do and whom we reach and represent products or services that we produce, refer to Table 5. An outcome is a level of performance or achievement of performance. An outcome is observable and measurable through assessment. This distinction is critical in developing an effective Program Assessment Record.

Table 5. Outputs

Activities – What we do	Participation – Who we reach
o Conduct workshops, meetings o Deliver services o Develop products, curriculum, and resources o Train o Provide counseling o Assess o Facilitate o Partner o Work with Media	o Participants o Clients o Students o Agencies o Decision Makers

What Do I Need to Include in the Program Assessment Record?

For each educational department, a Program Assessment Record must be completed. Each department may include a minimum of two Program Goals (Graduate Tracking Data and passage rate of Student Achievement Measures), and a maximum of six student learning outcomes. Please refer to the *Program Assessment Report,* Attachment 3 in *AUI 36-2602*.

Two Different Types of Assessment Measures: Direct and Indirect

Now that meaningful Program Student Learning Outcomes (PLOs) and Programs Goals (PGs) have been developed, measures to assess them must be determined. It is also important that the method of assessment be appropriate for the student learning outcome, that is, the means of assessment provides useful information. Each assessment measure must clearly match the PLO and PG being assessed. Assessment practices include direct measures of student learning. When assessing PLOs and PGs, best practice is to have two means of assessment for each. These assessment measures are to be systematic (repeated on a schedule) over time. Assessment measures are to be conducted for *all* students in the major or program (or a representative sample, See Appendix D). Assessment measures may be direct or indirect.

What is a "direct measure" of student learning?

Direct measures are tangible, observable, and measurable. Direct measures tend to provide more compelling evidence of exactly what a student has learned. Direct measures assess student performance of identified learning outcomes, such as mastery of a lifelong skill, require standards of performance. Direct measures are best used to determine how well a student is developing his or her writing skills, developing abilities to reflect critically, and integrating theory into practice.

What is an "indirect measure" of student learning?

Indirect measures tend to be proxy in nature. Indirect measures assess perceptions, opinions or thoughts about student knowledge, skills, attitudes, learning experiences, and perceptions. An indirect measure is typically a complement to a direct assessment measure.

Examples of Direct Measures of Student Learning:

- Scores and pass rates on standardized tests (licensure/certification as well as other published tests determining key student learning outcomes)
- Writing samples
- Pre- and posttests - Score gains indicating the "value added" to the students' learning experiences by comparing entry and exit tests (either published or locally developed) as well as writing samples
- Locally designed quizzes, tests, and inventories
- Portfolio artifacts (these artifacts could be designed for introductory, working, or professional portfolios)
- Capstone projects (these could include research papers, presentations, theses, dissertations, oral defenses, exhibitions, or performances)
- Case studies
- Team/group projects and presentations
- Oral examination
- Internships, clinical experiences, practica, student teaching, or other professional/content-related experiences engaging students in hands-on experiences in their respective fields of study (accompanied by ratings or evaluation forms from field/clinical supervisors)
- Service-learning projects or experiences
- Authentic and performance-based projects or experiences engaging students in opportunities to apply their knowledge to the larger community (accompanied by ratings, scoring rubrics or performance checklists from project/experience coordinator or supervisor)
- Graduates' skills in the workplace rated by employers
- Online course asynchronous discussions analyzed by class instructors

Examples of Indirect Measures of Student Learning:

- Course grades provide information about student learning *indirectly* because of a series of reasons, such as:
  a) due to the focus on student performance or achievement at the level of an individual class, such grades do not represent an indication of learning over a longer course of time than the duration of that particular class or across different courses within a program;
  b) grading systems vary from class to class; and
  c) grading systems in one class may be used inconsistently from student to student
- Grades assigned to student work in one particular course also provide information about student learning *indirectly* because of the reasons mentioned above. Moreover, graded student work in isolation, without an accompanying scoring rubric, does not reflect overall student performance or achievement in one class or a program
- Comparison between admission and graduation rates
- Number or rate of graduating students pursuing their education at the next level
- Reputation of graduate or post-graduate programs accepting graduating students

- Employment or placement rates of graduating students into appropriate career positions
- Course evaluation items related to the overall course or curriculum quality, rather than instructor effectiveness
- Number or rate of students involved in faculty research, collaborative publications and/or presentations, service learning, or extension of learning in the larger community
- Surveys, questionnaires, open-ended self-reports, focus-group or individual interviews dealing with *current students'* perception of their own learning
- Surveys, questionnaires, focus-group or individual interviews dealing with *alumni*'s perception of their own learning or of their current career satisfaction (which relies on their effectiveness in the workplace, influenced by the knowledge, skills, and/or dispositions developed in a program)
- Surveys, questionnaires, focus-group or individual interviews dealing with the *faculty, staff, and stakeholders'* perception of student learning as supported by the programs and services provided to students
- Quantitative data, such as enrollment numbers, graduation/completer rates, job placement data
- Honors, awards, scholarships, and other forms of public recognition earned by students and alumni
- Advisory board(s) feedback or evaluation
- Percentages of student who participate in a program such as study abroad

Benchmark

For each assessment measure, you must articulate the benchmark. A benchmark is the point of reference for measurement; a standard of achievement against which to evaluate or judge one's own performance. A program can use its own past-performance data as a baseline benchmark against which to compare future data/performance. Additionally, data from another (comparable, exemplary) program can be used as a target benchmark.

Validity and Reliability

Assessment measures for CLOs and PLOs can be developed by the faculty for each program offered. If a locally developed instrument is used, the validity and reliability of the instrument must be examined and reported.

Validity of the test refers to the extent to which the test actually measures what it intends to measure. In other words, the test is relevant, and the data collected is accurate and useful. To achieve the validity, when faculty develop an instrument, make sure that the content coverage and the content representation are sound, the meaning of the questions is clear to every student, and the grading or scoring criteria are fair and clearly specified before grading or scoring.

Reliability of a test or other measure means that the results do not differ significantly over time, i.e.

test results are not very high in one administration and then low in another if the content of the courses and the way these courses are being taught have not changed.

Internal and External Stakeholder Groups Considerations

An internal stakeholder focus group is an excellent way to gather thoughts and feelings about what works well and what is not working well within the organization. However, it may be difficult for employees to honestly share their thoughts and feelings because of fear of reprisal from other organizational members or fear of being ostracized by the organization. If you use internal focus groups to gather information the participants should be volunteers. Volunteers are less likely to fear reprisal or being ostracized. However, an all-volunteer focus group, as opposed to a randomly selected group, may present problems of organizational bias. At no time should the organization require employee participation with a focus group. A neutral un-biased facilitator should be used to lead the internal focus group. This may require a facilitator external to the organization.

An external stakeholder focus group is less concerned with reprisal and being ostracized. Citizens, board members, funding agents, other government agency representatives and external stakeholders are generally happy to "tell you what they think" about what your organization does and how you do it. All of these groups are affected by what you do and the processes you use.

Input from these people is paramount. Focus group questions should be prepared in advance and the same questions should be asked of each focus group. Focus group facilitators should take care to capture all the responses and may need additional assistance to capture group responses. If you use a focus group(s) to capture organizational information, be sure to:

- Reserve a large enough room to handle the group size
- Set aside enough time for people to adequately discuss and answer each question
- Have appropriate and adequate material to capture responses [e.g. flip chart paper, markers, tape or computerized equipment]
- Have refreshments for participants
- Assign someone to type a summary report for the planning team.

Rubrics:

Whenever appropriate, rubrics (scoring keys) help identify the knowledge, skills, and/or dispositions assessed by means of the particular assessment instrument, thus documenting student learning directly.

What are Rubrics?

A rubric is a scoring tool that explicitly represents the performance expectations for an assignment or piece of work. A rubric divides the assigned work into component parts and provides clear descriptions of the characteristics of the work associated with each component, at varying levels of

mastery. Rubrics can be used for a wide array of assignments: papers, projects, oral presentations, artistic performances, group projects, etc. Rubrics can be used as scoring or grading guides, to provide formative feedback to support and guide ongoing learning efforts, or both.

Advantages of Using Rubrics

Using a rubric provides several advantages to both instructors and students. Grading according to an explicit and descriptive set of criteria that is designed to reflect the weighted importance of the objectives of the assignment helps ensure that the instructor's grading standards don't change over time. Grading consistency is difficult to maintain over time because of fatigue, shifting standards based on prior experience, or intrusion of other criteria. Furthermore, rubrics can reduce the time spent grading by reducing uncertainty and by allowing instructors to refer to the rubric description associated with a score rather than having to write long comments. Finally, grading rubrics are invaluable in large courses that have multiple graders (other instructors, teaching assistants, etc.) because they can help ensure consistency across graders and reduce the systematic bias that can be introduced between graders.

Used more formatively, rubrics can help instructors gain a clearer picture of the strengths and weaknesses of their class. By recording the component scores and tallying up the number of students scoring below an acceptable level on each component, instructors can identify those skills or concepts that need more instructional time and student effort.

Grading rubrics are also valuable to students. A rubric can help instructors communicate to students the specific requirements and acceptable performance standards of an assignment. When rubrics are given to students with the assignment description, they can help students monitor and assess their progress as they work toward clearly indicated goals. When assignments are scored and returned with the rubric, students can more easily recognize the strengths and weaknesses of their work and direct their efforts accordingly.

Stevens and Levi (2005) articulated an additional discussion on the advantages of using rubrics for a variety of constituencies:

- Students: A rubric is an explicit statement regarding what is important for students to accomplish in the assignment. When students receive the rubric as part of the assignment description, they can ask relevant questions to clarify their understanding of the assignment before they complete and submit the assignment. (This also helps students to write better papers and decreases grading time for faculty and teaching assistants - see below.)

- Teaching assistants: Faculty can use the rubric to communicate what their Teaching Assistants should be focusing on in recitation sections. This is especially helpful when there are several Teaching Assistants for the same course.

- General education faculty who are teaching the same course: A rubric connects faculty from disparate fields and departments to the goals of general education and helps to

provide a coherence in the general education curriculum, without stifling a faculty member's creative and personal approach to instruction or the uniqueness of his/her field or specialty.

- New and adjunct faculty: A rubric is a convenient way to provide faculty with an explicit description of departmental or program standards and expectations.

- Writing Center staff: Students who are struggling with an assignment may have difficulty explaining the assignment to Writing Center staff. A rubric ensures that the expectations for the assignment are not "lost in translation" and that Writing Center staff can provide appropriate assistance.

- Departmental colleagues who are involved in curriculum development: A rubric can be used to create a shared understanding within the department regarding expectations for student learning and can provide focus for developing curriculum to meet those expectations.

Rubrics can help faculty and teaching assistants save time grading and focus instruction where it is most needed (Stevens & Levi, 2005).

- Rubrics provide a quick and efficient means for providing feedback on student papers: Rubrics include descriptions of common errors that students make (e.g., "The paper is missing some of the key counter-arguments to the thesis"). Rather than write these comments out longhand, the grader can simply circle this statement on the rubric.

- Rubrics provide a framework for feedback to the class and a focus for follow-up instruction and support: Faculty can use the rubric to keep track of common mistakes that students make on any given assignment. Faculty and Teaching Assistants can then provide additional supports and targeted instruction which address these particular weaknesses. In addition, for cases in which there is more than one grader (e.g., several Teaching Assistants for one course), a rubric is an especially useful shared framework for communicating overall student strengths and weaknesses to the faculty member.

Using rubrics does involve an initial time investment (creating the rubric, becoming adept at quickly and efficiently applying rubric standards to papers), but, based on feedback from faculty and students, the dividends are high: improved student performance on assignments (benefiting both students and faculty) and time saved assessing student papers.

Rubric Types:

Analytic Rubrics
An analytic rubric resembles a grid with the criteria for a student product listed in the leftmost column and with levels of performance listed across the top row often using numbers and/or descriptive tags. The cells within the center of the rubric may be left blank or may contain descriptions of what the

specified criteria look like for each level of performance. When scoring with an analytic rubric each of the criteria is scored individually, refer to Example 1.

Example 1. Analytic Rubric

Articulating Thoughts Through Written Communication—Final Paper

	Needs Improvement (1)	Developing (2)	Sufficient (3)	Above Average (4)
Clarity (Thesis supported by relevant information and ideas.)	The purpose of the student work is not well-defined. Central ideas are not focused to support the thesis. Thoughts appear disconnected.	The central purpose of the student work is identified. Ideas are generally focused in a way that supports the thesis.	The central purpose of the student work is clear and ideas are almost always focused in a way that supports the thesis. Relevant details illustrate the author's ideas.	The central purpose of the student work is clear and supporting ideas always are always well-focused. Details are relevant, enrich the work.
Organization (Sequencing of elements/ideas)	Information and ideas are poorly sequenced (the author jumps around). The audience has difficulty following the thread of thought.	Information and ideas are presented in an order that the audience can follow with minimum difficulty.	Information and ideas are presented in a logical sequence which is followed by the reader with little or no difficulty.	Information and ideas are presented in a logical sequence which flows naturally and is engaging to the audience.
Mechanics (Correctness of grammar and spelling)	There are five or more misspellings and/or systematic grammatical errors per page or 8 or more in the entire document. The readability of the work is seriously hampered by errors.	There are no more than four misspellings and/or systematic grammatical errors per page or six or more in the entire document. Errors distract from the work.	There are no more than three misspellings and/or grammatical errors per page and no more than five in the entire document. The readability of the work is minimally interrupted by errors.	There are no more than two misspelled words or grammatical errors in the document.

Advantages of Analytic Rubrics

- Provide useful feedback on areas of strength and weakness.
- Criterion can be weighted to reflect the relative importance of each dimension.

Disadvantages of Analytic Rubrics

- Takes more time to create and use than a holistic rubric.
- Unless each point for each criterion is well-defined raters may not arrive at the same score

Developmental Rubrics

Developmental rubrics are a subset of analytic trait rubrics. The main distinction between developmental rubrics and other analytic trait rubrics is that the purpose of developmental rubrics is not to evaluate an end product or performance. Instead, developmental rubrics are designed to answer the question, "to what extent are students who engage in our programs/services developing this skill/ability/value/etc.?" Generally, this type of rubric would be based on a theory of development, refer to Example 2.

Example 2. Developmental Rubric

Intercultural Maturity

Domain	Initial Level of Development (1)	Intermediate Level of Development (2)	Mature Level of Development (3)
Cognitive	Assumes knowledge is certain and categorizes knowledge claims as right or wrong; is naive about different cultural practices and values; resists challenges to one's own beliefs and views differing cultural perspectives as wrong	Evolving awareness and acceptance of uncertainty and multiple perspectives; ability to shift from accepting authority's knowledge claims to personal processes for adopting knowledge claims	Ability to consciously shift perspectives and behaviors into an alternative cultural worldview and to use multiple cultural frames
Intrapersonal	Lack of awareness of one's own values and intersection of social (racial, class, ethnicity, sexual orientation) identity; lack of understanding of other cultures; externally defined identity yields externally defined beliefs that regulate interpretation of experiences and guide choices; difference is viewed as a threat to identity	Evolving sense of identity as distinct from external others' perceptions; tension between external and internal definitions prompts self-exploration of values, racial identity, beliefs; immersion in own culture; recognizes legitimacy of other cultures	Capacity to create an internal self that openly engages challenges to one's views and beliefs and that considers social identities (race, class, gender, etc.) in a global and national context; integrates aspects of self into one's identity
Interpersonal	Dependent relations with similar others is a primary source of identity and social affirmation; perspectives of different others are viewed as wrong; awareness of how social systems affect group norms and intergroup differences is lacking; view social problems egocentrically, no recognition of society as an organized entity	Willingness to interact with diverse others and refrain from judgment; relies on independent relations in which multiple perspectives exist (but are not coordinated); self is often overshadowed by need for others' approval. Begins to explore how social systems affect group norms and intergroup relations	Capacity to engage in meaningful, interdependent relationships with diverse others that are grounded in an understanding and appreciation for human differences; understanding of ways individual and community practices affect social systems; willing to work for the

			rights of other

Advantages of Developmental Rubrics

- Useful when the evaluation aims to determine development level rather than the quality of a final product.

- Especially useful when there is no expectation that students should or could fully develop a skill or ability during the course of their education or potentially ever (such as in "Maslow's Hierarchy of Needs," there is no expectation people can or will become "self-actualized.")

- A rubric can be based on relevant developmental theory.

Disadvantages of Developmental Rubrics

- Conceptually, this type of rubric is more challenging to design.

- Developing a developmental rubric requires a close tie between assessment criteria and the theory of development.

Holistic Rubrics

A holistic rubric consists of a single scale with all criteria to be included in the evaluation being considered together (e.g., clarity, organization, and mechanics). With a holistic rubric the rater assigns a single score (usually on a 1 to 4 or 1 to 6-point scale) based on an overall judgment of the student work. The rater matches an entire piece of student work to a single description on the scale, refer to Example 3.

Example 3: Holistic Rubric

Articulating thoughts through written communication— final paper/project.
   4. Above Average: The audience is able to easily identify the focus of the work and is engaged by its clear focus and relevant details. Information is presented logically and naturally. There are no more than two mechanical errors or misspelled words to distract the reader.
   3. Sufficient: The audience is easily able to identify the focus of the student work which is supported by relevant ideas and supporting details. Information is presented in a logical manner that is easily followed. There is minimal interruption to the work due to misspellings and/or mechanical errors.
   2. Developing: The audience can identify the central purpose of the student work without little difficulty and supporting ideas are present and clear. The information is presented in an orderly fashion that can be followed with little difficulty. There are some misspellings and/or mechanical errors, but they do not seriously distract from the work.
   1. Needs Improvement: The audience cannot clearly or easily identify the central ideas or purpose of the student work. Information is presented in a disorganized fashion causing the

audience to have difficulty following the author's ideas. There are many misspellings and/or mechanical errors that negatively affect the audience's ability to read the work.

Advantages of Holistic Rubrics

- Emphasis on what the learner is able to demonstrate, rather than what s/he cannot do.

- Saves time by minimizing the number of decisions raters make.

- Can be applied consistently by trained raters increasing reliability.

Disadvantages of Holistic Rubrics

- Does not provide specific feedback for improvement.

- When student work is at varying levels spanning the criteria points it can be difficult to select the single best description.

- Criteria cannot be weighted.

Checklists

Checklists are a distinct type of rubric – where there are only two performance levels possible. Checklists tend to be longer than other types of rubrics since each aspect of performance you are looking for in students' work/performances essentially becomes its own criterion. When you are using a checklist, every decision is binary (yes/no, present/absent, pass/fail, etc.). Most rubrics can be converted rather directly into a checklist. For example, here is a rubric for grading journal entries:

Example 4: Rubric Converted to Checklist

Criterion	Excellent	Good	Adequate	Poor
Site Visits Notes	Every site visit includes good and thoughtful notes about that site	Every site has notes, but one or two days are not good/thoughtful notes OR one day of notes is missing	Every site has notes, but three of four days are not good/ thoughtful notes OR two days of notes are missing	Not every day has good/ thoughtful notes OR more than two days of notes are missing
Class Question	Not every day has good/ thoughtful notes OR more than two days of notes are missing	Is missing answers to no more than 8 questions across the site visits	Is missing answers to no more than 12 questions across the site visits	Is missing answers to more than half of the questions across the site visits
Reflection on Site Visits	Provided thoughtful reflection on each of the six site visits	Provided thoughtful reflection on at least 4 of the site visits OR provided reflection on all six but two or less were not thoughtful	Provided thoughtful reflection on at least 3 of the site visits OR provided reflection on all six, but three were not thoughtful	Provided thoughtful reflection on at least 3 of the site visits OR provided reflection on all, but four or more were not thoughtful

Here is the same rubric converted into a checklist:

Criterion	Yes	No
All Sites have Notes		
Sites Notes are Thorough		
Site Notes are Thoughtful		
Answers all Site Questions for All Sites		
Provided Reflection on each of the 6 Site Visits		
Reflection on Site Visits was Thoughtful		

Advantages of Checklists

Checklists are generally a simpler and faster way to grade than using a more traditional rubric since you are making discrete decisions for each individual performance criterion rather than determining where students' work fall into performance criteria that generally encompass a range of different performance expectations. This also makes the grading more evident to students. Using checklists may result in less arbitrary (and more consistent) grading decisions. For example, most instructors are clear on what the top performances look like and what the bottom performances look like, but the middle becomes unclear. When students understand that their grades will be based on all or nothing decisions, checklists also have the potential to raise the rigor of and students' performance on assignments.

Disadvantages of Checklists

Creating checklists for your assignments might be a slightly onerous process. This is both because checklists are longer than a traditional rubric and because identifying each of the discrete elements of "clearly written" or "well organized" might be difficult. You may find that you cannot easily convert every performance element you are looking for into a checklist format. Performance criteria that are difficult to operationalize will also be challenging to convert into a checklist. It may also be difficult to decide on the exact level of granularity that might be appropriate for each assignment. For example, "uses good grammar" might be appropriate for most classes, but it would be far too broad if you teach a course on grammar. Checklists also lose the middle so there is not a way to award credit to students who get most of the way toward achieving a criterion.

Sample Rubric Scales

These are some sample rating scales for you to consider as you develop a grading rubric. As you develop your rubric, decide how many different levels it should have and whether to list the highest possible level of achievement first or last.

Three Levels

Weak, Satisfactory, Strong
Beginning, Intermediate, High
Weak, Average, Excellent
Developing, Competent, Exemplary
Low Mastery, Average Mastery, High Mastery

Four Levels
Unacceptable, Marginal, Proficient, Distinguished
Beginning, Developing, Accomplished, Exemplary
Needs Improvement, Satisfactory, Good, Accomplished
Emerging, Progressing, Partial Mastery, Mastery
Not Yet Competent, Partly Competent, Competent, Sophisticated
Inadequate, Needs Improvement, Meets Expectations, Exceeds Expectations
Poor, Fair, Good, Excellent

Five Levels
Poor, Minimal, Sufficient, Above Average, Excellent
Novice, Intermediate, Proficient, Distinguished, Master
Unacceptable, Poor, Satisfactory, Good, Excellent

Six Levels
Unacceptable, Emerging, Minimally Acceptable, Acceptable, Accomplished, Exemplary

Curriculum Mapping

Curriculum mapping is a method to align instruction with desired goals and program outcomes. It can also be used to explore what is taught and how. The curriculum map is a table with one column for each learning outcome and one row for each course or required event/experience (or vice versa: each row contains a course and each column lists a learning outcome). See Appendix C for an example.

The map:
- Documents what is taught and when
- Reveals gaps in the curriculum
- Helps design an assessment plan

By using the curriculum map, departments can:
- Determine special strengths of the program (outcomes treated thoroughly)
- Determine whether the program is designed so that students take courses in their proper sequence (introduction, reinforcement, mastery and assessment of skills)
- Identify gaps in the curriculum (for example, if a student learning outcome is treated only in a couple of classes)
- Advise students more efficiently about why courses need to be taken in a particular sequence

Benefits of curriculum mapping:

- Improves communication among faculty
- Improves program coherence and increases the likelihood that students achieve program-level outcomes
- Encourages reflective practice

Creating the Curriculum Map

1. Faculty members begin with
   a) the program's intended student learning outcomes,
   b) recommended and required courses (including General Education courses if appropriate) and
   c) other required events/experiences (e.g., internships, department symposium, advising session, national licensure exams)
2. Create the "map" in the form of a table
3. Mark the courses and events/experiences that currently address those outcomes
   - Enter an "I" to indicate students are introduced to the outcome
   - Enter a "R" to indicate the outcome is reinforced and students afforded opportunities to practice
   - Enter a "M" to indicate that students have had sufficient practice and can now demonstrate mastery
   - Enter an "A" to indicate key assessment evidence is collected (Diamond, 1998).
4. Faculty members analyze the curriculum map. Faculty discuss and revise so that each outcome is introduced, reinforced/practiced, and then mastered and assessed.

Best practices in curriculum mapping:

- Build in practice and multiple learning trials for students: introduce, reinforce, master. Students will perform best if they are introduced to the learning outcome early in the curriculum and then given sufficient practice and reinforcement before an evaluation of their level of mastery takes place.
- Use the curriculum map to identify the learning opportunities (e.g., assignments, activities) that produce the program's outcomes.
- Allow faculty members to teach to their strengths (note: each person need not cover all outcomes in a single course). "Hand off" particular outcomes to those best suited for the task.
- Ask if the department/program is trying to do too much. Eliminate outcomes that are not highly-valued and then focus on highly-valued outcomes by including them in multiple courses. (The eliminated outcomes can still be course-level outcomes. They need not disappear completely from the curriculum.)
- Set priorities as a department/program. Everyone working together toward common

outcomes can increase the likelihood that students will meet or exceed expectations.

- Communicate: Publish the curriculum map and distribute to students and faculty.

- Communicate: Each faculty member can make explicit connections across courses for the students. For example, at the beginning of the course or unit, a faculty member can remind students what they were introduced to in another course and explain how the current course will have them practice or expand their knowledge. Do not expect students to be able to make those connections by themselves.

APPENDIX A: Examples of Direct and Indirect Measures

Chart 1

OUTCOMES ASSESSED	ASSESSMENT STRATEGY
Cumulative Learning	Capstone Course
Analytical & Information	Thesis/Research Project
Growth and Improvement	Skills Portfolio of Learning Experiences
Specific Competencies	Course Embedded Assessment
Knowledge & Cognitive Abilities	Standardized Tests
Program-specific Learning	Local Comprehensive Tests
Student Attitude Development & Activity Involvement	Surveys

Chart 2

OUTCOME	DIRECT MEASURE	INDIRECT MEASURE
Skill Development	*Apprenticeships *Mentorships *Skills Practica & Performance	*Employment experience *Meeting and seminars *Course attendance
Intellectual Growth	*Pre-Post Tests *Paper essays *Faculty-student discourse	*Pre-Post Tests *Paper essays *Faculty-student discourse
Professional Growth	*Internships *Assistantships *Clinical Experiences	*Pre-Post Tests *Paper essays *Faculty-student discourse
Cumulative Achievement	*Comprehensive exam *Integrative paper *Oral examination *Alumni and employer assessments	*Subsequent career

APPENDIX B: Example of Curriculum Map

CURRICULUM MAP AND KEY ASSESSMENTS (EXAMPLE)

Overview: Curriculum Mapping and Key Assessments are the second and third steps in educational program effectiveness.
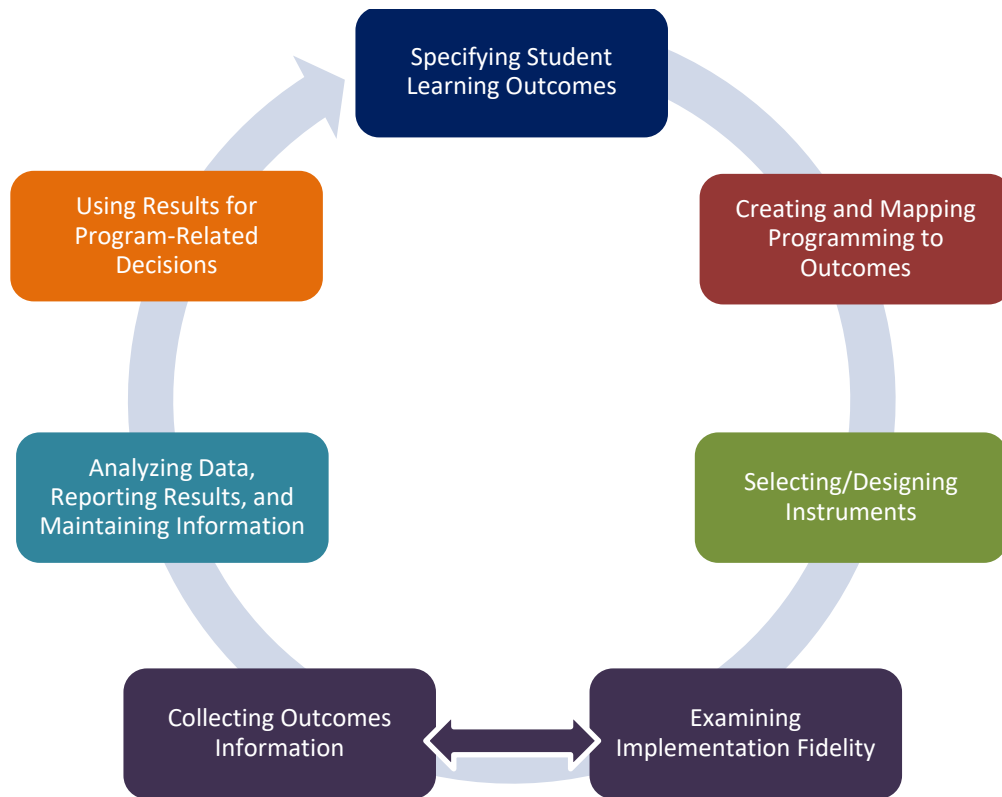
Section 1: Curriculum Map - Linking program outcomes (student-learning outcomes), what you expect students to know and be able to do once they complete the program, to specific courses in the curriculum.

Individual courses and curricula should be developed within the program's goals and reflect a coherent plan of study.

Curriculum mapping is a strategy that helps to identify which courses bear responsibility for particular outcomes and to make certain that the curriculum offers a rational sequence of courses. The curriculum should be organized so that each learning outcome's knowledge and skills are first introduced, further developed, mastered, and assessed.

Curriculum mapping helps identify and illustrate how program goals are addressed and learning outcomes achieved through required and recommended coursework. The template below is provided

to help you link program goals and outcomes to specific curriculum courses.

Instructions:

1. List three to six expected student learning outcomes.

2. List all courses that students are required or encouraged to take. Be sure to include major field requirements, major field electives, and formal learning experiences (such as internships, capstone courses)

3. Connect learning goals, outcomes, or objectives to specific courses. Indicate if the goal is (I) introduced, (R) further developed and reinforced, (M) mastery or satisfactory achievement, and (A) key assessment will be administered and data collected.

Course	Program Outcomes					
	1	2	3	4	5	6

Key
I = Introduce
R = Reinforced and opportunity to practice
M = Mastery at the exit level
A = Key assessment evidence collected

Adapted from: Diamond, R.M. (1998). *Designing & Assessing Courses & Curricula.* San Francisco: Jossey-Bass.

Section 2: Key Assessments – linking the appropriate assessment to the program outcome.

All outcomes include an action verb indicating what a student is expected to know, think, or do as a result of program participation. Each verb acts as a hint about what type of instrument is appropriate. For example, an PLO that states students will "recognize" certain information could be assessed by a multiple-choice or matching question. In contrast, for an PLO that states students should "explain" something, an open-ended question would be more appropriate. Please refer to the Institutional Effectiveness Teams' Channel for additional resources, including a document entitled *Instructional Verbs and the Associated Modes of Assessment*.

The Key Assessment Worksheet Template is designed to assist you in aligning the assessments to the outcomes.

Key Assessment Instrument Worksheet Template

Action Verb in each PLO	Knowledge, Skill, or Disposition Sought	Mode of Type of Assessment (multiple choice test, writing sample, survey, observation)	Theoretical Underpinning	Type of Outcome Measurement (Direct or Indirect)	Key Assessment Name	Benchmark or Success Criterion	Administration is congruent with Curriculum Map (yes/no)

After selecting or designing key assessment instruments that align with your outcomes, it is useful to develop a key assessment instrument-to-outcome map. In this map, you will specify which assessment instruments measure which outcome. Suppose a key instrument measures more than one PLO. In that case, identify which specific items map to each outcome. Additionally, include information about instrument quality and how each instrument/item will be scored in your key assessment instrument-to-outcome map.

Key Assessment Instrument-to-Outcome Map

Outcome	Title of Assessment Instrument	Number of Items	Scoring	Reliability	Validity	Date Assessment Instrument will be re-evaluated

APPENDIX C: Recommend Assessment Sample Sizes for Educational Program

The following table is for population sizes of 10 to 500. N stands for the total number of students in the degree program; n stands for the size recommended in a sample. The sample sizes are based on the 95% confidence level and a random sampling methodology.

N	n	N	n
10	10	230	144
15	14	240	148
20	19	250	152
25	24	260	155
30	28	270	159
35	32	280	162
40	36	290	165
45	40	300	169
50	44	320	175
55	48	340	181
60	52	360	186
65	56	380	191
70	59	400	196
75	63	420	201
80	66	440	205
85	70	460	210
90	73	480	214
95	76	500	217
100	80		
110	86		
120	92		
130	97		
140	103		
150	108		
160	113		
170	118		
180	123		
190	127		
200	132		
210	136		
220	142		

Johnston, B. & Christensen, L. (2012). Educational research – Qualitative, quantitative, and mixedapproaches (4th ed.). Thousand Oaks, CA: Sage Publications, Inc. p. 234

APPENDIX D: Rubric to Grade a Rubric

Criteria	Beginning	Developing	Accomplished	Exemplary
Statement of Purpose. Purpose is clearly stated	Purpose is not clearly stated.	Purpose is somewhat clearly stated.	Purpose is mostly clearly stated.	Purpose is very clearly stated.
Criteria. observable and measurable reflect important and essential elements distinct from other criteria clear and unambiguous language.	Few of the criteria are observable and measurable; few reflect the most important and essential elements of the task; few are written with clear and unambiguous language.	Some of the criteria are observable and measurable; some reflect the most important and essential elements of the task; some are written with clear and unambiguous language.	Most of the criteria are observable and measurable; most reflect the most important and essential elements of the task; most are written with clear and unambiguous language.	All of the criteria are observable and measurable; all reflect the most important and essential elements of the task; all are written with clear and unambiguous language.
Rating Scale. The number of items reflects purpose of assessment.	The number of rating points does not reflect the purpose of the assessment.	The number of rating points somewhat reflects the purpose of the assessment.	The number of rating points mostly reflects the purpose of the assessment.	The number of rating points clearly reflects the purpose of the assessment.
Performance Descriptors. observable and measurable use parallel language across the scale indicate amount, frequency or intensity	Few of the performance descriptors are observable and measurable; few use parallel language across the scale; few indicate	Some of the performance descriptors are observable and measurable; some use parallel language across the scale; some indicate	Most of the performance descriptors are observable and measurable; most use parallel language across the scale; most indicate amount, frequency or	All of the performance descriptors are observable and measurable; all use parallel language across the scale; all indicate amount,

	amount, frequency or intensity.	amount, frequency or intensity.	intensity.	frequency or intensity.
Reliability. **inter-rater reliability** (consistent scoring among multiple graders) **intra-rater reliability** (consistent scores with the same grader over time)	Rubric does not provide inter-rater or intra-rater reliability.	Rubric provides some inter-rater and intra-rater reliability.	Rubric mostly provides inter-rater and intra-rater reliability.	Rubric provides strong inter-rater and intra-rater reliability.
Validity. **content validity** (skills measured represent the skills in the broader domain area) **construct validity** (criteria reflect the knowledge and skills you are attempting to measure) **criterion validity** (rubric score is similar to a score given in a real-world context) **face validity** (rubric appears to be valid to its users)	Rubric does not provide content, construct, criterion, or face validity.	Rubric provides some content, construct, criterion, and face validity.	Rubric mostly provides content, construct, criterion, and face validity.	Rubric provides strong content, construct, criterion, and face validity

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convey effective feedback and promote student learning.* Sterling, VA: Stylus Publishing.

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Jossey-Bass.

Resources

In Office 365, there is an Academics - Institutional and Program Effectiveness Channel that is updated periodically. Please visit the following link for up-to-date resources:

https://teams.microsoft.com/l/team/19%3acab6ad113dff4f57914743dac63deed6%40thread.tacv2/conversations?groupId=32afa85f-aeba-46f4-bb16-bde3a15e5cb7&tenantId=9f90e2a5-baf5-4a37-87bd-48acea06e6e2