

A Tale of Two Rubrics: Improving Teaching and Learning Across the Content Areas through Assessment

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Abstract

This is a story of two different assessment rubrics, similar in design but different in content area and pedagogical context. One rubric is from a course in the College of Arts and Media in an advanced painting class; the other is from the College of Architecture and Planning in a landscape architecture studio design class. Each rubric is described and the ways in which each rubric supports teaching and learning is discussed. These two rubrics are intended to be examples for other faculty to emulate as well as evidence of the role that rubrics can play across many different fields and disciplines. The article concludes with a description of the steps in designing a rubric and a process for using rubrics for course and program improvement.

Keywords: Rubrics, assessment, teaching, learning, higher education.

Assessment rubrics, or guides for scoring student performances, work in a number of ways to advance student learning in higher education (Wolf & Stevens, 2007). They not only improve assessment quality (Arter & McTighe 2001), they can also enhance teaching and learning (Stiggins 2001), with particular potential for non-traditional, first-generation, and minority students (Delpit 1988). In addition, rubrics can be a vital component of an effective outcomes assessment system, contributing to program improvement and university accreditation (Angelo 2002).

Sometimes the relationship of assessment to teaching and learning isn't always obvious to faculty, few of whom have had formal pedagogical or assessment training. While faculty members are experts in their subject matter and can implicitly describe basic to advanced proficiency in their students, developing explicit rubrics can help faculty better understand the role that assessment can play in promoting learning. Rubrics clarify the interdependent relationship of assessment and teaching and learning--the relationship of what students are expected to learn, how well they are learning it, and what can be done to further promote that learning. While formats can vary, a rubric is essentially a matrix in which the learning outcomes (e.g., written communication) are listed down the side and the levels of performance (e.g., proficient) across the top, with descriptions of the performance for each outcome at each level described in the cells of the matrix (see Table 1).

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Table 1. Rubric format

Performance Levels Performance Criteria	Advanced	Proficient	Basic
Criterion A	Description of performance	Description of performance	Description of performance
Criterion B	Description of performance	Description of performance	Description of performance
Criterion C	Description of performance	Description of performance	Description of performance
Criterion D	Description of performance	Description of performance	Description of performance

This first section of this article introduces two different rubrics from two different fields and the contexts in which they were created, along with a discussion of their implications for teaching and learning. These two rubrics, similar in design but different in content areas, are intended to be examples for other faculty to emulate, but also to provide evidence that rubrics can be productively employed across many different fields and disciplines. The following sections then briefly highlight the scholarly literature on the topics of assessment and rubrics, describe steps in designing a rubric and suggest a process for course and program improvement through rubrics.

Tale of Two Rubrics

The two rubrics presented in this section share the same basic format but focus on two different fields within the university. Mary Connelly, an assistant professor in the College of Arts and Media, describes the rubric that she developed for assessing her undergraduate students' advanced painting portfolios. Ann Komara, an assistant professor in the College of Architecture and Planning, describes the rubric she developed for assessing her graduate students' studio design projects in landscape architecture.

The institution in which these two professors work is a research university located in an urban setting with twelve schools and colleges spread across three downtown campuses. The downtown campus, where these two programs are located, has approximately 4500 graduate students and 8300 undergraduates, many of whom are non-traditional, first-generation, and students of color.

A Rubric for Assessing Painting Portfolios in the College of Arts and Media

The students in Mary Connelly's undergraduate advanced painting class in the College of Arts and Media were asked to prepare a portfolio of their paintings, along with related work such as a sketchbook and reflections on their learning. The rubric used to assess their portfolios is presented in Table 2.

Table 2. Rubric for advanced painting midterm review

Evaluation Criteria	Outstanding 4 points	Proficient 3 points	Evolving 2 points	Below Expectations 1 point
Inventiveness (25%) <ul style="list-style-type: none"> • <i>Takes risks and tests new approaches</i> • <i>Applies knowledge from research to solve problems and enhance work</i> • <i>Demonstrates unique style and voice</i> 	Shows high degree of risk-taking by testing new approaches; re-searches and utilizes new approaches to enhance work; expresses a unique, personal style and voice.	Demonstrates some risk-taking and experimentation; ideas are re-searched and gathered from different sources; starting to take an independent direction and style.	Not taking risks in process or ideas; does not research or seek multiple visual sources to approach work from several angles; holding too closely to an established style.	Risk-taking and experimentation are not evident; supporting research is missing; lacks independent direction.
Craftsmanship (25%) <ul style="list-style-type: none"> • <i>Demonstrates knowledge and mastery of tools and materials</i> • <i>Presents work in professional manner</i> • <i>Researches contemporary and historical approaches to craft</i> 	Demonstrates a high degree of knowledge; presents work in a highly professional manner; always seeking to learn more about the medium and tools to improve expertise.	Skilled with and knowledgeable of tools and materials; presents work in a professional manner; carries out research on methods and materials of his/her craft.	Demonstrates incomplete knowledge of and mastery of tools; presentation of work is not professional; neglects research of craft.	No or little evidence of craftsmanship; work habits appear disorganized; care and use of materials and tools appears haphazard and unaligned with project.
Productivity (25%) <ul style="list-style-type: none"> • <i>Produces sufficient amount of work</i> • <i>Uses class time effectively</i> • <i>Seeks input of instructors and peers</i> 	Produces more than 10 paintings in the semester including studies and drawings for major works; highly focused in class; actively seeks input from instructor and peers.	Produces the minimum of 10 paintings in the semester; makes good use of time in class; welcomes input from professor and peers.	Produces less than 10 paintings in the semester; begins several directions, but not able to finish all works; reluctant to engage regularly with instructor and peers.	Produces few paintings; has difficulty in getting started in class or does not attend; shows no consistency in working styles; does not engage with others.
Sketchbook (10%) <ul style="list-style-type: none"> • <i>Contains sufficient number of sketches</i> • <i>Includes ideas/plans for paintings</i> • <i>Includes study of modern and master artists</i> 	Exceeds 70 pages; Contains drawings from life, includes ideas for paintings; includes multiple studies of one or more master artists.	Meets the minimum 70 pages; contains drawings from life and ideas for paintings; contains studies of master artists.	Does not meet the minimum 70 pages; lacks ideas for future paintings; insufficient study of master artists.	Sketchbook entries are few; lacks ideas/plans for future painting; master artist studies are missing.

Students in this course are in their final year of a four-year B.A. or B.F.A. At this advanced level, emphasis is placed on independent investigation of technical, formal, and conceptual issues in painting. The students are also expected to explore professional goals in painting by doing research into exhibition opportunities in local galleries and investigating the option of doing graduate work for the Master of Fine Arts degree. Meetings with guest artists and visits to galleries and museums, required in addition to studio

activity, are critical at the advanced level to help students develop an individual direction and professional attitude.

The format of the class is self-directed studio work, critiques, and intensive tutorials. The committed student will work in the studio 15 hours per week as a minimum, including class time. By semester's end, each student is expected to create a body of ten paintings and related drawings. Individual and group critiques are the cornerstone of the class, with an emphasis on critical dialogue that challenges students through interactions with other artists and their peers. Art historical research is a major expectation; students must give an oral presentation to the class, and be capable of articulating in written and oral manner the critical issues in historical and contemporary traditions of painting, placing their own work in context to this history. The development of individual artistic direction, or "voice," as evidenced by conceptual invention and discovery, is one of the central goals of this course.

Though she initially resisted the idea of rubrics as too rigid for assessing creative process, Mary decided to try rubrics as a way of making her assessments clearer and fairer. She reports that changing her assessment practices has made her grading more consistent and defensible. According to Mary, a rubric provides her students with detailed descriptions of the levels of development that she expects. As a communication tool, she contends the rubric encourages active learning and the artistic development of students by providing a framework for assessing process and product as well as the development of a self-reflective studio practice. The rubric also serves as an outline of her teaching philosophy—making clear her role as a facilitator to actively engage students in their own learning through hard work, creative inquiry and skilled execution.

The portfolio rating constitutes 85% of the grade for the course, with the remaining 15% based on additional writing assignments. In Mary's rubric, an "outstanding" rating for the portfolio translates into an A grade, "proficient" is a B, "evolving" is a C, and "below expectations" can be either a D or an F.

Several features of Mary's rubric are important to note. The criteria for the performance—"inventiveness, craftsmanship, productivity, and sketchbook," are listed down the side. Note that each of these criteria has been further explained by three key attributes. In the case of "inventiveness," the student "a) demonstrates knowledge and mastery of tools and materials, b) presents work in professional manner, and c) researches contemporary and historical approaches to craft." Also note that the different levels for the performance are described across the top—"advanced, proficient, evolving, and below expectations." The information in the cells themselves more fully describes key features of the performance for each criterion at each level.

The rubric for this course, then, is intended to capture the spirit of the learning experience and make clear the expectations for students' performances through the four criteria for assessing the painting portfolio. While creativity is greatly valued in Mary's rubric, so too is craftsmanship and a committed studio practice. From Mary's perspective, investigation into a variety of media and knowledge of the work of master artists, past and pre-

sent, nurtures creativity and informs a painter's choices and direction. As well, productivity is a valued outcome, for Mary believes that students will need perseverance and drive to succeed as a professional artist. Both perspiration and inspiration are necessary ingredients in advancing students' learning. The nature of that creativity and productivity are conveyed in the descriptions in the rubric itself. Students' active engagement and discovery as reflected in their sketchbooks is a vital feature of the learning experience in the studio classroom and an essential life-long practice as professional artists. Thus, the rubric not only strengthens Mary's assessment of her students' work by making the criteria for her ratings and their alignment with the assignment and course outcomes clearer, the rubric also guides students in reflecting on their own work and in building a portfolio that better demonstrates their learning and prepares them to become practicing artists.

A Rubric for Assessing Studio Projects in the College of Architecture and Planning

The second example is from Ann Komara's studio class for first year graduate students in landscape architecture. The semester consists of two major projects - a mid-term and final - each evaluated through similar rubrics, with a few additional short exercises assessed with checklists. The rubric used to score their final design project is presented in Table 3; a similar rubric was used for mid-term assessment. For this major final assignment, students were to prepare and present a design project, including products developed along the way to demonstrate a design process. The students were expected to build on the lessons from mid-term to accomplish their work for the final.

Ann's design course is the required foundation studio that introduces students to the three-year master's degree in landscape architecture program. The program attracts students from varied backgrounds, so there can be no assumptions about knowledge bases in the field. She coordinates the course, which she co-teaches with two other studio faculty; they rotate through the students over the course of the semester. The course syllabus states:

Through engaging *concept, language, form, and consequence* in the context of landscape architecture, students develop strategies for reading local, regional, and global landscapes. In this class they will be introduced to strategies for understanding and manipulating the landscape as the locus of spatial, temporal, physical, cultural, sensory, and perceptual phenomena and processes. In addition, students will be required to develop their skills in oral and graphic presentations pertaining to designs, ideas, and places.

The rubric evaluations emphasize the course goals through process, product and presentation.

The format of the class is individual studio work facilitated through desk critiques, with some team and partner work. The successful student will work in the studio a minimum of 18 hours per week, including 9 hours of class time. Individual and group critiques with faculty, their peers, and visiting designers foster an ongoing dialogue about the design.

Table 3. Rubric for midterm studio design project in landscape architecture

Midterm Review LA5500	Implemented/Integrated (4-5)	Developing (2-3)	Absent/Emerging (1)
Concept: <i>An abstract, generative idea that expresses or leads to predicates for design; the point of beginning, or the potential basis for design exploration</i>	The conceptual idea(s) are clearly expressed, original, and robust. They respond to site and contextual factors, and are well developed and reflected in many aspects of the design. The student explained their design process and the genesis and evolution of the concept, including the mapping work.	Conceptual idea(s) are sound, and are clearly stated. The idea(s) are richer rather than limited, and offer possibilities for developing the design. The student can explain their idea and provide some details to explain the evolution of the idea, with some mapping explained.	Conceptual idea(s) are absent or minimally identified. Student exhibits poor understanding of how to derive conceptual ideas, and cannot explain a process for developing and testing the idea. The mapping work was not strongly integrated into the project's concept or execution.
Language: Graphic <i>The representation and communication of ideas through visual (graphic) media</i>	All components are present and legible, and the sheets are composed to effectively communicate the design and ideas. Site plan and sections are rendered. Concept images support the design. Work is innovative and shows exploration of ideas.	The sheets and individual drawings are complete but may still warrant further rendering or revisions. The composition of the sheet is addressed. Work is competent and demonstrates developing skills.	The drawings are incomplete (parts missing or not rendered) and/or the components are difficult to read. The sheets are poorly composed. The work lacks visual development and depth.
Language: Oral <i>Effective spoken and written communication of design ideas and the related appropriate use of design language</i>	The presentation is dynamic, smooth and well delivered, with clear points and a logical flow. The speaker used their time well, and employed effective, expressive, and appropriate language. The boards included titles and used well-written text to explain the ideas.	The presentation is coherent and makes clear points about the work. The language is clear and supports the presentation. Student may not have used the time well, but was generally in command of the presentation. Some text/titles appear on the sheets.	The presentation is unfocused and lacks coherence. The speaker paid little or no attention to the audience and did not adhere to the time limits. The speaker failed to speak to their work. There was little or no text or title on the boards, and/or text/titles were poorly written.
Form: Model <i>A three dimensional product created to communicate spatial aspects of the design, with attention to materials and detail</i>	The design is spatially developed and clearly articulated. The model demonstrates scale and shows design responses including treatment of edges, and the use of contours or a shaped ground plane. Materials are well chosen and the model is well crafted. Study models are shown.	The model demonstrates a developing grasp of spatial relationships and expresses the concept. Edges and ground plane are addressed but may not be resolved. The model materials are well chosen and the craftsmanship is good. Study models might be shown.	The spatial ideas are unresolved, and the design exhibits little or no attention to edges or to the shaping of the ground plane. The model materials are ineffective in supporting the design intentions, and/or the model is poorly executed. No study models are shown.
Form: Design <i>The organization and resolution of the design; the intentional shaping of parts into specific relationships</i>	The design supports the concept. It is appropriately scaled, with clarity and intention evident in the arrangement of the parts. A potential visitor's experience of place is understood, evident and developed.	The design supports the concept. Scale is somewhat addressed. The arrangement and relationships of parts are intentional, but could be further studied. Potential for human experience is understood.	The design is unresolved, with no clarity to parts or their relationships. Scale issues are not understood. There is no evident understanding of a visitor's experiences of place.

The format of the class is individual studio work facilitated through desk critiques, with some team and partner work. The successful student will work in the studio a minimum of 18 hours per week, including 9 hours of class time. Individual and group critiques with faculty, their peers, and visiting designers foster an ongoing dialogue about the design process and outcomes. Central to studio investigations are questions that pertain to how landscapes are understood, represented, revealed, and shaped. Although students build their knowledge of these traditions in the other core classes required in the first semester, they are expected to bring this knowledge to bear in studio. Supporting this development, studio periods occasionally include lectures and presentations exploring issues of landscape architecture design, representation, and experience.

Ann, too, was skeptical about rubrics and their usefulness for evaluating creative expression. After developing and using rubrics specifically designed for the two projects, she felt that the rubrics contributed to several positive changes. Grading the students became more consistent between the three studio teachers, and the teaching team found it easier to discuss the student projects through the clarity of the shared professional language of the rubric. More broadly, Ann asserts that using the rubrics mitigates the studio tradition which relied heavily on personal aesthetic judgments about student work. This constitutes a significant shift – the role of the “studio master” is deeply entrenched within design training, and although there have been shifts since the 1990s to studio instruction as a guided inquiry, the dominance of the “expert” persists in studio teaching (Malecha, 1993). While the project assessments still require a faculty member’s professional expertise, the value of the rubric is the framework of criteria and categories denoting a common ground of values and goals.

This basis holds for both students and faculty. The rubrics provide studio students with detailed descriptions of the key categories of emphasis and the levels of development; they also support the faculty as facilitators who actively promote student understanding and engagement with design as process and product. As a communication tool, Ann asserts that the rubric encourages active learning and growth for students by providing a shared professional language and a framework for self-reflection in assessing process and products in the development of a studio practice. The rubrics helped students develop an ability to discuss and critique their work and the work of others, which is a fundamental skill required in the profession. This outcome was enhanced by the faculty’s use of the rubric as both formative and evaluative tool building from mid-term to final.

The mid-term rating constitutes about 35% of the grade for the course, with the remaining grades based on the other assignments; the final juried presentation and products are about 50% of the grade reflecting a cumulative assessment. Rubric evaluations occur during studio juries when students make presentations to a group of visitors who comment on the work; the guests often include professionals from the community, visiting faculty, and peers. Because of the importance of the mid-term for both the students’ grade and their development, the studio teachers also meet individually with each student. Students are asked to self-evaluate using the rubric; in many cases, they review a video recording of their jury review to help them reflect on their presentation and work. Then the teachers and student discuss the outcome and strategize for ways to improve based on the criteria

of the rubric, the student's performance and goals, and the curriculum learning goals. Thus, the mid-term rubric helps establish guidelines for the student's development as a designer, and sets the base for expectations for the final.

From the faculty perspective, the rubrics help "neutralize" these important discussions, shifting the focus away from individual as "right or wrong" to emphasize instead the goals, projects, and outcomes. Ann reports a significant increase in student satisfaction with their evaluations at both mid-term and final. This is evidenced at the faculty-student meetings, where it was quite common to hear comments like, "I see my improvement in 'some area' and know what I want to work on for next time." She also noted that there was a much greater convergence between student and faculty scores at the final than there had been at mid-term; she suggests that this reflects an increasing comfort with and knowledge of the design process, products, and languages of presentation. She thus asserts that the rubric directly contributes to a positive learning outcome.

Examining Ann's rubric shows the relationship between course goals and student achievement. Five performance criteria topics, drawn from the syllabus and treated as equal in importance, line the left-hand side of the form; across the top of the form are the performance levels, with point values from zero to five.

The text describing the various criteria reflects several important aspects of designing a rubric. Each "topic word" is supported with a definition that aligns faculty and students in a common language; this also gives clarity to the category objectives. The text for the performance level outcomes uses parallel ideas to make comparison easier. For instance, under "Concept" the language in the first sentences for each performance level describes conceptual ideas as "clearly expressed, robust, and original" [implemented and integrated]; "sound and clearly stated" [developing]; or "absent or minimally identified" [absent or emerging]. This parallel structure is evident throughout the rubric. Finally, although the language used is grounded in the discipline of landscape architecture, it has enough clarity that the rubric made sense to colleagues from other fields. Ultimately, it allows the students access to the discipline in a non-exclusive way that supports their beginning work.

The State of Assessment and the Role of Rubrics

Assessment and accountability have become increasingly significant topics of conversation in higher education (Palomba & Banta, 1999). The accountability movement has been driven in part by politicians' and the public's concern about the rising cost of college and a desire for more and better evidence of student learning, while the assessment emphasis has been prompted in part by the higher education community's search for more effective ways to promote learning for an increasingly diverse student body (Shavelson, 2007). Adding to the push are the higher education accrediting organizations who now ask institutions to demonstrate effective outcomes assessment systems as a requirement of accreditation (Wolf & Goodwin, 2007). Assessment of student learning is becoming increasingly prominent across all disciplines and fields (Banta, Lund, Black, & Oblander, 1996). Undergraduate education, and the general education portion in particu-

lar, has been receiving the most attention, including from the federal government where there is currently a push to put in place standardized tests of undergraduate learning (Shavelson, 2007).

Assessment, however, is about more than assessment per se. Assessment experts describe a cycle that begins by clearly articulating learning outcomes, designing and implementing sound assessment approaches, analyzing and interpreting assessment results, and making course or program improvements guided by the assessment information to better advance student learning (Miller, 2007).

Assessment approaches include direct measures of learning such exams and performance assessments, and indirect measures such as student knowledge surveys or national surveys of student attitudes. Assessments can be course or program based, or designed by faculty or national organizations. Performance assessments, such as portfolios or demonstrations, which use student activities or products as opposed to tests or surveys to evaluate student knowledge and skills, can effectively capture and even promote learning, but they are particularly difficult to assess as well. A valuable way to strengthen the assessment of these complex performances is to fold rubrics into the assessment process (Wolf & Stevens, 2007). Rubrics make the learning target more visible to students, better enabling them to hit it, especially if they are given the rubrics in advance of undertaking the assignment. Rubrics guide teaching by highlighting for both students and teachers the key concepts in the assignment or course. Rubrics make the assessment process more accurate and fair. Rubrics provide students with a tool for self-assessment and peer feedback. While rubrics are not a panacea and they are time-consuming to construct, they can offer these benefits and more (Arter & McTighe, 2001).

Designing Effective Rubrics

The three main steps in designing a rubric are: 1) identifying performance criteria, 2) setting performance levels, and 3) creating descriptions of performances for each criterion at each level (see Table 1). For a fuller description of these steps and a discussion of the benefits and limitations of rubrics, see Wolf & Stevens (2007) in the *Journal of Effective Teaching* (www.uncwil.edu/cte/et/articles/Vol7_1/Wolf.pdf). While the two rubrics in the present article focus on the studio arts, included in the aforementioned article is an example of a rubric for assessing a small-scale social science research study. Assessment information and examples of rubrics for other disciplines and topics can be found at various websites, such as the site on assessment maintained by North Carolina State University (www2.acs.ncsu.edu/UPA/assmt/resource.htm), another more specifically on rubrics in higher education by Winona State University (<http://www.winona.edu/air/rubrics.htm>), and another with multiple rubric examples maintained by Exemplars (www.exemplars.com/resources/rubrics/assessment.htm), a company that provides assessment tools for schoolteachers.

With each of these three steps in designing a rubric there are considerations. For example, in the first step of identifying the criteria for a performance (e.g., spoken and written communication), three to six criteria typically work best so that students can keep the

main concepts in mind as they are preparing their projects, and faculty can keep the same criteria in mind when grading the performances. If there are more than seven criteria, people typically can't keep all of them in mind at the same time when viewing or evaluating a performance; if there are less than three criteria however, they are usually too global to generate feedback specific enough to guide learning. To further clarify the criteria, sometimes it is useful to identify several attributes that operationalize or define each criterion. For example, note in Professor Mary Connelly's rubric for assessing her students' painting portfolios how for each criterion (e.g., productivity), she presents three attributes (i.e., produces sufficient amount of work, uses class time effectively, seeks input of instructor and peers).

The next step is to decide on the number and names for the performance levels. A common format is to have three levels of performance such as basic, proficient, and advanced. In setting performance levels, typically three to five work best. Having only two levels (essentially pass/fail) does not allow faculty members to give nuanced feedback or assign grades to the performance based on the rubric. But when there are more than five levels, faculty members can have trouble reliably distinguishing among performance levels. On a ten-point scale for example, the distinctions between a seven and eight can be hard to capture in a way that people can reliably apply them.

Writing the paragraph descriptions of performances for each criterion at each level is essential but challenging. The goal is to write brief descriptions that capture the essence of the performance. As pointed out by Professor Ann Komara, the paragraphs should be written so that they are roughly parallel across performance levels to better allow comparisons to be made between levels such as "proficient" and "advanced," for example. Note that these descriptions can be in bullet form rather than paragraph form. Paragraph descriptions promote a more holistic and integrated view of the performance while bullet point descriptions better allow an analytical view of its separate parts. In writing the paragraph descriptions, most instructional designers recommend focusing first on the qualifications for a "proficient" performance—essentially describing the features of a performance that demonstrate that the student has met the expectations for the assignment, and then creating the descriptions of performances on either side of "proficient."

A word about grades: the relationship of rubric levels to assignment or course grades isn't always straightforward for a number of reasons. If desired, a rubric with five performance levels can be designed to directly correspond to an A-F grading system for an assignment, but in a graduate course, for example, in which most students would be expected to get an "A" or a "B" on major assignments, three levels (e.g., superior, mastery, needs improvement) might be adequate to describe the performances with the lowest level reserved for the infrequent "C," "D," or "F." In this case, the instructor would need to distinguish among these "needs improvement" performances in assigning a grade, and then provide more customized feedback to these students. In other situations, a rubric may correspond to percentages that are used to determine an overall course grade. And, in some instances, course grades may be based on more than rubric scores on major assignments and may include additional information such as student participation in class and completion of homework.

In general, a rubric is most effective if everyone can quickly learn and internalize all of the key features of a quality performance, and that is best achieved if the rubric can be presented on a single page or two. Furthering strengthening the power of the rubric is to have several descriptions, or even actual examples, of projects on a variety of topics at different performance levels available to students for review.

A Process for Putting Rubrics in Place

To increase the likelihood that the rubrics that are developed will be on target, it is helpful for faculty to clarify the learning outcomes, identify the relevant learning experiences, create quality assessments, and then design the rubrics. These steps are intended to better ensure that the rubrics are aligned with and support the course or program goals.

First, have faculty clarify the learning outcomes for the assignment, or for the course and program more broadly if appropriate. The question to be addressed is: What should students know and be able to do? This step can take a few hours or several working sessions. Faculty members sometimes realize from these discussions that they don't have shared understandings or that what they want students to learn hasn't been sufficiently defined.

Next, have faculty members in a program list all of the learning opportunities for students in the course or program (e.g., courses, labs, studios, internships), and then indicate which key outcomes are addressed through each of these learning opportunities. Displaying this relationship between learning outcomes and learning opportunities in a matrix format (i.e., curriculum mapping) can help highlight instances in which students are asked to demonstrate a skill but have not been given guided opportunities to learn and practice it. Common examples of outcomes that are valued, or even assessed, in a course or program but rarely directly taught, are "the ability to work in teams" or "a passion for learning." At this point, faculty need to decide to remove or revise these outcomes or, alternatively, create learning experiences for students to develop the targeted skills.

In the next step have faculty develop key assessments that address one or more of the course or program learning outcomes. These assessments can take the form of a course-based project or test, or an end-of-program portfolio or national exam. These key assessments should capture important features of the valued outcomes for the course or program and be appropriate to the nature of learning being investigated. For example, a multiple-choice exam is not a good match for assessing studio projects, nor is a portfolio typically an effective way to measure breath of factual knowledge. Sometimes faculty find that for some of the program or course outcomes there are no direct assessments of student learning, and conversations then ensue about whether the outcome is valued or if assessments should be developed to measure student learning for a particular outcome.

Finally, have faculty develop rubrics for scoring student performances on these key assessments. Often, when faculty begin to develop rubrics for assessing key student performance, they re-visit the learning outcomes or the criteria for the performances they are evaluating because they recognize that they are sometimes not as explicit or precise in

describing the outcomes or the assessment criteria as they thought they were. They then go back and forth from the learning outcomes to the assessment criteria until there is good alignment between the two and both clearly express the goals of the program or course. Conversations then arise about how best to teach the concepts or whether to modify the course, setting into motion a re-visiting of all parts of the process from syllabus construction to program design. Once rubrics are thrown into the mix, these consequences are predictable--and desirable.

It is worth noting that although rubrics do not replace the professional judgment that faculty members must draw on in assessing their students' performances, they can go a long way towards strengthening that judgment and, ultimately, supporting teaching and learning in the process.

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