

USING RUBRICS TO IMPROVE TEACHING PERFORMANCE: A REVIEW OF RECENT LITERATURE

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Abstract

This paper presents an overview of the recent literature on rubrics as an improvement tool for teaching performance. Improving teaching and instruction is an item of the quality assurance system in Thailand's higher education institutions and appropriate processes or activities have to be reported in the post-teaching report (Mor Kor Or 5) for each course. Therefore, methods for improving teaching are outlined before the use of rubrics is analyzed and recent literature on the topic is discussed and commented. The goals of this paper demand the use of tools fostering formative assessment rather than summative assessment, so the application of descriptive rubrics is favored over the use of simple scoring rubrics, which actually represent rating scales or grading tables. Appropriate descriptive rubrics force the instructor to focus on the desired learning outcomes and not on the task or performance. 'Appropriate' means that the criteria to be assessed align to learning outcomes and not to the task itself. Another contribution of this paper is a meta-rubric for rubrics, which is of help when assessing formative descriptive rubrics.

Keywords: Descriptive Rubrics, Course Development, Teaching Improvement, Formative Assessment

Introduction

The original meaning of rubric is "a direction for performing church services"¹, which were written in red script (Latin: *color ruber*, red color) used for Christian church services. In modern educational settings, we use the term rubric as "a standard for assessing the performance of a defined group of people". The activity for establishing or using a rubric is called *to rubricate*.

Rubrics were introduced in the 1970s when the need came up to train a large group of raters using clearly described multi-dimensional (=multi-criteria) developmental ratings to find the overall score. Applied in this way, rubrics supported students' self-assessment and self-reflection. Additionally, rubrics enabled new ways of interaction between teachers, students and parents.

¹ <http://dictionary.reference.com/browse/rubric> (accessed on August 2, 2015)

Nowadays, rubrics typically consist of generally accessible criteria and standards derived from the curriculum or similar document stating the learning objectives. Each of the criteria may carry a specific weight in the overall conclusion of assessment and performance evaluation.

Most people recognize the quality of a performance (excellent, good, average, poor) but may not be able to state the criteria by which they came to their impressions. If teachers in their role as evaluators cannot even describe what proper performance is, then they cannot make informed and meaningful judgments about the quality of their students' performances. Ideally, rubrics turn subjective assessments of task performance into objective assessments by stating clearly what is being assessed (Walvoord, 1998).

Rubrics were originally introduced to provide feedback to people as a formative assessment structure supporting the quality enhancement of their work. Nevertheless, rubrics are often used as a tool for communicating qualifications for final summative assessment. Good rubrics tell people how they can perform well in an educational setting. I use the word 'people' because rubrics in educational settings can be used for student as well as for teacher performance. Jonassen (2014) concludes that rubrics are particularly effective for the assessment of performance regarding complex and ill-structured problems. Since many experts regard teaching as a complex problem (or task), it is maintained that rubrics can effectively contribute to the improvement of teaching as well. A useful overview of rubrics for making learning goals and assessment criteria clear to *students* has been given by Allen and Tanner (2005) and by Reddy and Andrade (2010). In this paper, I concentrate on the use of rubrics by *teachers* for improving teaching, which has gained increased attention in recent years; see the overview in Section 4.

Nevertheless, instructors also see shortcomings in using rubrics: rubrics as a tool for summative as well as formative assessment have been criticized for being too time-consuming to produce and too clumsy to use. The development of appropriate rubrics takes a considerable amount of time, especially for the beginning developer. On the other hand, teachers who want to assess their students' performance in a fair way have to consider their values and expectations regarding the outcome of assignments. Moreover, as Luft (1999) has shown: if rubrics are used to have students perform peer-reviews of their own work or of that of others, than this can trigger the development for self-directed learning and help students understand how they actually learn. As with every craft rubric-making needs some experience to result in products that can be used smoothly and with ease. Practice makes perfect as, for example, in computer programming, where initial results produced by novices usually lack usability and professionalism, which increases with practice.

In the following, I argue with the help of results and observations of recent studies that the application of rubrics can lead to improved instruction and teaching in accordance with *Mor Kor Or 5/Section 6 Course Evaluation, Subsection 2 Other evaluative measures* (Ministry of Education, Thailand). This is based on the observation that rubrics can support self-assessment

not only by students but also by teachers. Moreover, carefully designed rubrics can support students' understanding of the skill levels they need to perform well, and this, too, potentially leads to improved teaching by organizing the teacher's instructional work in such a way that their students can indeed perform well.

This paper is organized as follows: in the next section method-based improvements of instruction based on three methods are briefly discussed: self-reflection, critical review and documentation. After that the role of rubrics for improving teaching is analyzed, before a review of recent literature on the topic is presented.

Method-based improvement of teaching

Nowadays, teachers aim at improving their students' 21st century skills, which comprise a number of skills that students need to show to achieve in order to succeed in a globalized economic community. Consider critical thinking skills and lifelong learning among the commonly accepted skills. Besides the fact that there is no set of skills that is commonly agreed upon between experts of the field of human resource management, most teachers of today are not trained to develop these skills. As a consequence, they have to work out best practices of teaching 21st century skills by themselves. Moreover, faculty members rarely exchange teaching experiences, i.e. what has worked and what has not in their teaching approaches (Shulman, 2004). Several ways lead to improved teaching experiences, and they are studied in more detail in the following subsections: self-reflection, critical review and documentation

Reflection for improvement

Making meaning is one of the fundamental aspects of learning and development (Kegan, 1994). For more than 2000 years self-reflection has been used to make meaning of the world, beginning maybe with Socrates and since then reinforced by many scholars (Dewey, 1933; Kolb, 1984).

The reflecting individuals intentionally make experiences meaningful with the help of a systematic process similar to the scientific method. They examine their beliefs and assumptions and consider actions that lead to further insights and learning. Reflection enables instructors to make active use of their tacit knowledge, i.e. the knowledge they are not aware of (Rodgers, 2002). To put it on a more basic level: all children have learned that open fire is dangerous if they try to touch it. The experience of burning themselves makes them aware of the danger of heat and lets them stay away from such things as hot plates.

Some researchers see reflective learning as a cycle, which first engages learners in a concrete complex situation leading to experiences. Learners then think about the experience and build abstract conceptualizations, which finally may lead to active experimentation (Kolb, 1984).

Since teaching is a complex task, the reflective learning cycle can be applied by instructors to improve their teaching.

Critical review for improvement

Whereas reflection, or reflective thinking, points at own experiences to be analyzed, critical review focuses more on the outside world of teaching and learning. Thereby, critical review is more a kind of analysis of factors influencing the instructors and their teaching by looking outside themselves. Teaching leads to diverse outcomes, some may be successful, some may be frustrating and some may lead to failures. Using critical review, instructors understand that these results do not happen by chance but by many variables, which are beyond their influence.

Looking outside themselves, teachers obtain information from three major sources for their analysis: (1) students, (2) peers (co-teachers), and (3) the literature (body of knowledge on teaching and subject). Analyzing the literature for improving teaching, requests the instructor to be information literate and critically review research studies, whereas the information from students and peers needs to be unbiased, trustful and straightforward. The latter can be a problem in hierarchical cultures that put more emphasis on the role of teachers and their teaching than on students and their learning. Students and peers of lesser rank may feel discouraged to engage in presenting their true views on the teaching experiences even if they needed improvement, or they may take an inappropriate teaching approach for granted out of respect to their teachers. In this case, the data analysis would be based on unsuitable data and flawed in itself.

Documentation for improvement

Insights obtained by self-reflection and critical reviews should be carefully documented and organized to help keep track of a wide range of aspects regarding teaching and learning. Writing down experiences enhances deeper reflection and encourages the review and reexamination of ideas (Brookfield 1995). Instructors should keep records of specific problems that students may encounter, such as common misconceptions (and how they have corrected them) and the effectiveness of specific assignments and classes.

In the era of Facebook and blogging, taking notes of their own lives is a quite common part of daily life of young people. Putting this note-taking onto a professional level should be just a matter of practice and motivation, regardless of how the notes are actually taken: a personal blog (or wiki), journaling, keeping a notebook (on paper), or comments on their teaching materials and students' products.

It is important to note here that all three methods to improve teaching mentioned above can be effectively supported by rubrics. This is further outlined in the next section.

Improving teaching by using rubrics

Improvement is generally considered to be a *process* by which individuals, besides organizations, act intentionally to move from a lower level condition C_l to a higher level condition C_h . This process implies a temporal and qualitative development to the state C_h . The development takes place in a set of steps, an example of which is shown in Figure 1². And the difference in situational assessment before and after performing the steps is the improvement, which should be of positive value (as is depicted in Figure 1); otherwise, it would be a failure of the actions taken during the process.

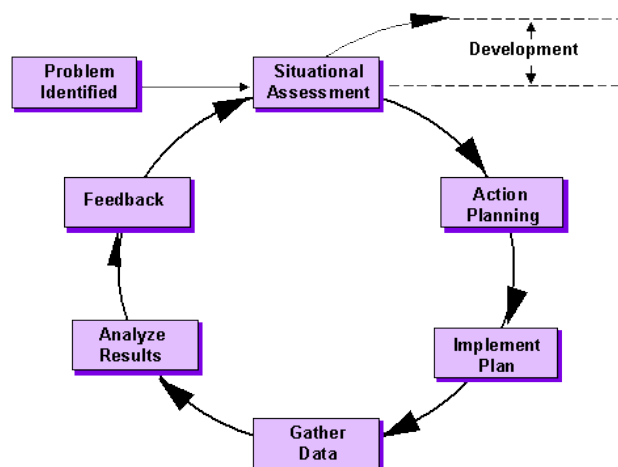


Figure 1 One cycle of the development process (performed at a certain condition)

The problem every instructor (and evaluator) is faced with is how to assess the development gain (or loss) after going through each cycle of this developmental process. All that is usually needed consists of a qualitative assessment rather than an exact figure of evaluation, e.g. by summative assessments. Rubrics can be applied to different kinds of evaluation and assessments but they are not *evaluative* as such. The principle of rubrics application is to match observations of performance to descriptions of the quality of performance.

Many teachers use matrix-like models (rubrics) for student performance for summative as well as formative assessments, so they are familiar with this kind of tool. And they know that these models are as effective as the selected dimensions for the observations (i.e., criteria) and the descriptions of the levels of performance. Therefore, one can expect some experience with the application of rubrics on the teacher's side and relating observations of students' performances. Since we are interested in improvement of teaching, instructors are requested to create and use rubrics for self-reflection, critical reviews and documentation *at different levels of*

² from <http://hrpeople.monster.com/nfs/hrpeople/photos/0000/0031/dev-gr.gif>

development. The concept of different levels of development addresses the idea that teachers with more experience should show higher levels of performance than, for example, novice teachers. As a consequence, the application of "one rubric for all" is not an effective solution, rather it should be replaced by a kind of developmental rubric, which changes according to the maturity of the individuals' performances it is deemed to describe and observe.

The idea of performance at any level of maturity is related to the *learning goals* set by the instructor, or instructors in a co-teaching class and not to the task itself by which students show their learning achievements. In Table 1 an example "rubric" regarding a poster on kinetic theory of gases is shown, which focuses on the task and not on any evidence of learning. Teachers who use this kind of assessment tool actually look for compliance and do not ask their students to show what they have learned. Moreover, by including points in the "rubric" the instructor created an old-fashioned grading scheme or grading scale. This is not what rubrics are. What could a teacher tell about the knowledge gained about the kinetic theory of gases using this rubric? This rubric is actually about a presentation class, which shows students how to present a given topic in a talk applying whatever means.

Table 1 Poor example of a "rubric" assessing posters on kinetic theory of gases

Criteria	1 point	2 points	3 points
Facts	no equation is given	one equation is given	more than one equation is given
Graphics	graphics do not relate to the topic	one graphic is related to the topic	more than one graphics is related to the topic
Attractiveness	the poster is messy or very poorly designed	the poster is somewhat attractive	the poster is very attractive
Correctness	there is more than one error in the text	there is one error in the text	there are no errors in the text

Effective rubrics tell students which parts of the body of knowledge and which set of skills are important to present in their products in order to show learning. Writing an effective rubric forces the teacher to answer the following questions:

1) How does good work by students look like and how can I describe it for my curriculum?

2) What do I have to look for during the assessment if I had to defend my marking?

Question 1 leads to the criteria, or dimensions, of the students' product. Question 2 leads to the description of levels of quality.

Instead of looking for criteria of the task itself, instructors need to focus on the criteria of learning by performing the task. Effective criteria should be Appropriate, Observable, Definable, and Capable of being differentiated.

The criteria levels of the product should be described in terms of observations and not in terms of quality conclusions (marking points or grades) the instructor would draw. In the end, of course, the descriptions of the performance levels are used to grade but they should not distract the students from trying to achieve the highest level. These descriptions can be general or more specific, whereby general descriptions are preferred.

General observational descriptions regarding kinetic theory of gases could include: "uses the main equations of the field of study and derives them". If deemed appropriate, more specific descriptions can be made here: "explains the relationship between kinetic energy and temperature and pressure, respectively, in equational form".

The step described above supports the teaching preparation process in that it leads to clear descriptions of learning outcomes and fosters the analysis of past instruction. Considering the example above, if the instructors want students to explain relationships between the concepts mentioned, they will have to teach these relationships, e.g. with the help of the constructivist approach.

Besides the distinction of summative (grading/marking) and formative (improvement-oriented) rubrics, there is also a distinction in their structure: (1) holistic rubrics describe the overall elements of the product as a group of criteria, and (2) analytic rubrics describe each criterion with a separate level of achievement.

Recent literature on using rubrics to improve teaching

A review of the literature on rubrics for formative assessment prior to 2011 has been given by Goldin (2011). He concludes that "although there is theoretical justification for the use of rubrics and a great deal of research on rubric use in writing assessment, especially for summative purposes such as placement ..., the research base on application of different rubrics in formative peer assessment is small and inconclusive."

With a specific focus on post-secondary education, Reddy and Andrade (2010) analyzed the empirical research as by 2009. They found four studies having dealt with changes and improvements in course delivery and design, which was a rather meager base for making informed decisions given the many different educational settings for course delivery and design. An interesting observation in their analysis is the fact that students perceived rubrics more positive than instructors. They report the literature showing a tendency for instructors to resist the use of rubrics and acknowledge this perception as valid: "why spend a lot of time figuring out a new way to do what we have done for decades?" This is true for rubrics as scoring guides but not for formative assessment to promote learning by cooperating on the creation of rubrics with the

students. Nevertheless, it must be stated that results of rigorous studies regarding the effect of rubrics on the promotion of learning were inconclusive, may be due to the fact that there were a small number of such studies available. Moreover, Reddy and Andrade concluded that important aspects of the validity of rubrics have not yet been studied at all. They also demanded more research studying the effects of rubrics outside the English speaking world, which they found dominating the discussion prior to 2010. Another serious gap in the literature was a sufficient number of studies on rubrics beyond scores but for teaching purposes.

Method

The qualitative review reported on in the following covers the literature of the last four years and analyses, which of the problems mentioned above have been tackled or solved. The search of the literature was performed the following way: Literature databases used: Springerlink, ScienceDirect, ProQuest, Google Scholar, Emerald Insight, EBSCOhost

Keywords and phrases: all of the following string searches included the search term "rubrics", "formative assessment", "formative evaluation", "descriptive rubrics", "improving instruction", improving teaching", "improvement of teaching" and similar orders of keywords; the publication years covered 2010 until 2016 (including preprints)

Number of papers: 248 of which 67 were duplicates, leaving 181 for further study; after the analysis of the abstracts and concluding remarks of each paper 20 studies remained for further examination.

The remaining papers were skimmed for the existence of practical rubrics used in the study, for the geographical and organizational (educational level) setting of the study and for the teaching subject(s) covered.

Findings

This sub-section is divided into two parts: in the first part, a tabular overview of the recent literature on improvement of teaching is given; in the second part, a qualitative analysis of the recent literature on rubrics for improving teaching is reported, which may lead to further research in the area.

In Table 2 an overview of the findings is presented covering the scope, the field of study, and the educational and geographical environments. Most of the literature is concerned with the issue of using rubrics for student assessment, either in a self-assessment or a teacher-centered assessment approach. Nevertheless, the idea of using rubrics for improving teaching more directly has emerged in recent years as has been referenced to in the upper part of Table 2.

Table 2 Overview of the literature analyzed in this study

Scope	Field of study	Environment	Rubrics disclosed	References
Improving the teaching approach	information literacy	college (USA)	yes	Carbery and Leahy (2014)
	political science	university (Australia)	yes	Rublee (2014)
	economics	university (USA)	no	McGoldrick and Peterson (2013)
	computer science	university (USA)	yes	Manson and Olsen (2010)
Improving student assessment	science	college (USA)	no	Zhang and Misiak (2015)
	English language	Technical University (Sweden)	yes	Nordrum, Evans and Gustafsson (2013)
	geography	Secondary education (Spain)	no	Panadero, Tapia and Huertas (2012)
	writing (research proposal)	college (USA)	yes	Lipnevich et al. (2014)
	ESL writing	university (South Africa)	yes	Simpson and McKay (2013)
	composition class	university (USA)	yes (generic rubrics)	Burnett et al. (2014)
	complex competencies	5 th grade primary school (Switzerland)	yes	Smit and Birri (2014)
	nursing	university (Hong Kong)	no	Li (2016)

Besides the more practice-oriented accounts reported on in Table 2, there are also studies directed at backing up prior findings and initiating further research into the topic of rubrics. Li and Lindsey (2015) have explored the variations of understanding rubrics and their application between students and teachers and found significant discrepancies that need to be addressed when rubrics are to be applied successfully in the writing classroom. The most striking difference

between the two groups was the focus on individual catchwords on the side of the students, whereas teachers were more attracted to connections between concepts organized within the rubric. They conclude that students do not grasp the context of keywords they can identify and, therefore, encourage writing rubrics in a more simplified language that students can understand without being fully aware of traditions and hidden expectations of professional teachers. This is backed by Peeters (2015), who stated that if we are "using subjective human judgments within learning assessments, using a simple rubric is paramount."

In a recent thought-provoking report, Hiroshi Ito (2015) has asked whether a rubric is worth the time and effort spent by the teacher and provided many answers by Japanese teachers in the field, who have to deal with the daily practice of different assessment methods and standards. Typically, teachers are expected to create (or at least use) a lesson plan for their teaching efforts. With an effective lesson plan being tied to the curriculum, teachers set the goals for learning outcomes, and they, therefore, know what students have to deliver if they want to succeed in class. Ito concludes from his literature review that instructors do not explain their grading by using written rubrics but rather by internally known grading mechanisms. Experience of life, which can also be applied to academics including teachers, tells us that if people cannot express a concept clearly, they do not understand the concept in enough detail to master it. Teachers write many things down that students need to know, so why not also the assessment criteria? It should also be mentioned that hidden information on the assessment mechanism can easily lead to bias in assessment and evaluation. Ito also carried out interviews to understand the attitudes of Japanese teachers in higher education regarding the use of rubrics. Not one of the professors (full, associate, assistant) mentions the student involvement in the process of creating useful rubrics. Mostly, they complain about the time-consuming process of building rubrics, and one professor stated that some items students produce "are hard to be assessed by rubrics and thus instructors have to use their own judgment." This approach leads to a more subjective assessment method than necessary. One might ask, how the professor could ever defend their marking/grading in case of students' complaints.

Laurian and Fitzgerald (2013) have reported on students' views on rubrics for a Romanian literature class. One of the objectives of their questionnaire was to discover how many students do actually use rubrics for their assignments when rubrics are available: 95% of the students asked by questionnaire responded positively to this question. Of course, students want to get positive grades, so their motivation is to use rubrics as a tool to find out what teachers expect them to present as a response to assignments. On the other hand, teachers encourage students to be independent thinkers and not rehashers using only their teachers' ideas that have been stated as rubrics. This really important observation leads to the question of how to create rubrics that allow assess the level of critical thinking by students which is one of the important skills of 21st century students.

Improving students' learning does not only refer to content knowledge but also to such pedagogical capabilities as presentations, which are accompanied by formative assessment using rubrics. Hung et al. (2013) report on a theory-driven rubric relating multimodal assessment of student presentations. Multimodal presentations include textual, visual and auditory means of conveying information (or knowledge) to the audience. This can be delivered in an appropriate and effective way, which can be evaluated by useful rubrics. In their paper, Hung et al. focused on an ESL presentation class in Taiwan and managed to cope with five dimensions of assessment: design for linguistics (the language), visual purposes (the show), gestural signs (animating the content), auditory effects (help the listener learners), and spatial arrangements (clarify the overall design of the delivery). They introduce a radar chart (or spider diagram) to make sense of corresponding data regarding the evaluation by the teachers. On the other hand, student feedback data show that students use the rubrics discussed during class to improve their presentations, especially in the part of gestural, auditory and spatial modes that they did not pay much attention to before the feedback session on discussing the rubrics.

Discussion

Among others, Reddy and Andrade (2010) as well as Panadero and Jonsson (2013) demanded more rigorous research to strengthen evidence for using rubrics in education, especially in higher education. To provide researchers with appropriate data, Hack (2015) has made available large data sets under the terms of the Creative Commons Attribution License. She hopes to promote robust research into the impact of rubrics of learning and teaching, which can be a source for further studies. She "provides access to anonymized student marks in five assessments on three modules prior to and following the deployment of rubrics."

The recent literature also shows that research on rubrics is no longer restricted to the USA and the UK but has been lifted on a more international level, thereby gaining attention in other parts of the educational community (Sweden, Spain and Switzerland are examples, Table 2). This may be due to encouraging results of students' performance gains through the use of rubrics, though these are not entirely confirmed so far.

Not only is the geographical coverage of research on rubrics extending but also the number of areas has increased, in which rubrics are applied. Rubrics used to be mainly a tool for the language teacher, especially in ESL (English as a Second Language) education as well as for student presentations. During recent years, rubrics have been designed and applied for many different areas: nursing, computer science, political studies, geography, and complex competencies. Additionally, a prospective field of application for high-quality rubrics is peer reviewing of academic work and publications.

Finally, a rubric for evaluating rubrics (a meta-rubric) is provided (see Table 2), which can be used to assess formative or descriptive analytical rubrics. The meta-rubrics cover the

content and the application of the rubric. Its criteria comprise the clarity and completeness of the criteria of the rubric under consideration. Second, the provision of distinctive levels between the possible scores is described and assessed, and finally the readability of the rubric text itself is scored. Regarding the application, the meta-rubric evaluates the level of sharing of the rubrics with the participants to be evaluated, i.e. by conveying the expectations and criteria of the rubric owner. If needed, the meta-rubric also takes into account, how much the participants could support the construction of the rubric.

Table 2 Meta-rubric (a rubric of rubrics), all criteria apply to the average expert/teacher/student

Area	Criteria	Basic or x points or Needs much improvement ...	Intermediate or $x\pm$ points or Needs improvement ...	Advanced or $x\pm\pm$ points or Can be applied ...
Rubric Content	Completeness	Criteria are missing	Criteria are not in accordance with standards, e.g. the curriculum	Criteria are complete and follow appropriate standards
	Selectiveness	Levels of criteria leave room for subjective grading	Levels of criteria may not be clear to people involved in grading but there is no room for subjective grading	Levels of criteria are clear-cut and leave no room for subjective grading
	Distinctiveness	Distinction between levels of achievement is unclear	Some distinction levels are too narrow or too big: people who grade have to make assumptions	The grading levels are logical and clear
	Readability	Some wording is not understandable to all users of the rubric	Some wording is not understandable to a group of users of the rubrics, particularly students	Wording is so understandable that all users can reliably agree on scores
Rubric Application	Rubrics sharing	Rubrics are not shared with participants to be evaluated	Rubrics are shared after the completion of the artefact the	Rubrics are used to guide student work cooperatively

Area	Criteria	Basic or \underline{x} points or Needs much improvement ...	Intermediate or $\underline{x}\pm$ points or Needs improvement ...	Advanced or $\underline{x}++$ points or Can be applied ...
			participants have to deliver	from the beginning of the task
	Participant involvement	No involvement	Can comment on the rubric	Joint construction of the rubric

Conclusions and outlook

In this paper, the literature on formative and analytic rubrics between 2010 and 2016 has been analyzed in view of the problems raised in the report provided by Reddy and Andrade (2010). Some issues have been tackled in recent years, and the data repository on using rubrics has been consistently extended by scholars, while other problems remain untouched. Especially, approaches to more rigorous research need to be taken. One of the contributions of this paper is a meta-rubric for rubrics, which is of help when assessing formative analytical rubrics.

An important question not fully answered yet is how to create rubrics that allow the assessment of students' critical thinking skills. Further work is necessary in the area of providing rubrics for metacognitive skills. Another prospective field to study in more detail is the influence of educational cultures on the acceptance and effective use of rubrics, most favorably with a view on multicultural settings.

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