Willis, J. (2012). Adapting the 2008 NETS-T Standards for use in teacher education: Part I. *International Journal of Technology in Teaching and Learning, 8*(1), 1-20.

# Adapting the 2008 NETS-T Standards for Use in Teacher Education: Part I

Jerry Willis
*St. John Fisher College, Rochester*

The revised 2008 ISTE NETS for teachers includes standards and indicators as well as rubrics. The standards, indicators, and rubrics present some problems and difficulties when used in preservice teacher education including indicators that change the type of practice expected at different quality levels of the rubrics instead of using rubrics based on differences in quality across the different levels of application. The NETS-T rubrics are also analytic rubrics rather than holistic rubrics. Holistic rubrics are more appropriate for evaluating professional behavior in complex, ill-structured contexts such as teaching. Holistic rubrics are also more compatible with programs based on models other than instructionist, teacher-centered, direct instruction approaches. In teacher education, using holistic rubrics and portfolios may be a more successful way of evaluating individual and program performance than the analytic rubric approach integrated into the NETS-T standards. A companion paper will address the question of how to integrate such an approach into the routine and ongoing evaluation of a teacher education program.

Keywords: educational technology, instructional technology, teacher education, technology integration, rubrics, analytic rubrics, holistic rubrics, program evaluation, ill-structured, portfolios, ISTE, NETS, NETS-T, NETS for Teachers

In 2008 the International Society for Technology in Education completed its first revision of the National Educational Technology Standards for Teachers (NETS-T). A year earlier ISTE published revised educational technology standards for K-12 students, and the revised standards for education leaders were published in 2009 (http://www.iste.org/standards/nets-for-administrators.aspx).

Eight years before, ISTE (2000) published the first edition of NETS-T, and it described the second version as "refreshed standards" in the booklet that presented them to the field (ISTE, 2008). I am not sure I would agree with that characterization and the

*Jerry Willis is a faculty member at the Executive Leadership Doctoral Program at St. John Fisher College. He can be reached at jwillis@sjfc.edu*

reasons why are part of the explanation for my presentation of some alternative ways to use NETS-T in pre-service teacher education. This paper and a companion piece that will be published in an upcoming edition of this journal, explores both the appropriateness of the NETS-T standards as guiding principles in teacher education programs, and the possibility of incorporating those standards in ways that are different from those suggested by the developers of the NETS-T framework. This first paper focuses on the rubrics and indicators that give the standards meaning and on the issues involved in using them in teacher education programs.

## COMPARING THE FIRST AND SECOND NETS-T

In 2000 and 2008 ISTE published a set of standards along with a number of "performance indicators" for each standard. Table 1 (see Appendix) summarizes the standards that are the foundation of the first and second versions of NETS-T. The quotes about the 2000 standards are from the online document "NETS for Teachers 2000" published by ISTE (http://www.iste.org/Content/navigationlVlenu/NETS/ForTeachers/ 2000Standards/NETS for Teachers 2000.htm) and the quotes about the 2008 standards are from ISTE (2008).

After reading and comparing the two sets of standards I do not agree that these are just "refreshed standards." They are significantly different in at least four ways.

### *THE CONSTRUCTIVIST FOCUS IN 2008*

The meaning of the standards is not solely contained in the standards themselves. Standards like "Model digital age work and learning" or "Facilitate and inspire student learning and creativity" have little meaning until you read the performance indicators that flesh out these slogans. A number of the 2008 performance indicators have shifted from neutral language (or at least language that can be interpreted to support a range of approaches to teaching and learning) to the language of constructivist theory. Many of the performance indicators for the 2008 standards are essentially expressions of constructivist learning theory with the additional requirement that it be done "with technology." As an ardent constructivist myself I do not have any difficulty viewing the new standards as very good expressions of what I consider to be a desirable approach to teaching and learning in American schools and in teacher education. There are, however, two other strong and active paradigms in education today. One has several terms associated with it - direct instruction, instructionism, behavioral learning, teacher-centered learning - but they are all based on an ideology of schooling that is quite different from that of constructivism. The third movement in education is critical theory, also called radical pedagogy, pedagogy of the oppressed, Freirian pedagogy, youth empowerment, and emancipatory learning. It is also an approach to schooling that is radically different from constructivism. I suspect that my constructivist enthusiasm for the new standards may be counterbalanced by less enthusiastic endorsements from advocates of direct instruction and critical pedagogy paradigms who find that it is much harder to convert the 2008 standards and performance indicators into goals and objectives compatible with their preferred paradigm.

### *THE INCREASED EMPHASIS ON TEACHER LEADERS*

Since the first standards were created in 2000 there has been a growing awareness in American education that leadership in schools and districts is not the sole domain of official administrators. The concept of *teacher leader* has matured and developed into a

movement that insists teacher education programs prepare their graduates to be leaders, and that schools and districts not only allow but nurture and support teacher leaders. The 2008 standards reflect that changing perspective and require teachers to demonstrate leadership in several ways. This is a less controversial shift in emphasis than the stronger endorsement of constructivist pedagogy, but it does present some issues for teacher education programs because the NETS-T performance indicators for teacher leadership are generally couched in terms that apply to practicing teachers rather than pre-service teacher education students.

### *GLOBALIZATION, CULTURAL AWARENESS, AND THE NEW STANDARDS*

Another shift in the standards that is not likely to be very controversial is the requirement that global issues and global communication and collaboration become a part of the professional and teaching life of a technology-using educator. The performance indicators that emphasize globalization and cultural awareness are reflections of a general shift in American education that acknowledges the increasing interdependence of nations and cultures.

### *THE SHIFT FROM PREPARATION TO PRACTICE*

Yet another interesting aspect of these two sets of standards is that the 2000 standards were presented as standards that "focus on preservice teacher education and provide a framework for implementing technologies in teaching and learning." However, the 2008 standards are presented this way: "Effective teachers model and apply the National Educational Technology Standards for Students ... as they design, implement, and assess learning experiences to engage students and improve learning; enrich professional practice, and provide positive models for students, colleagues, and the community. All teachers should meet the following standards and performance indicators." The five standards follow, each with four "performance indicators." For example, for Standard 1, *Facilitate and Inspire Student Learning and Creativity,* Performance Indicator d is *"model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments."* The 2008 standards and performance indicators focus sharply on professional practice. This is probably desirable but it does mean teacher education programs will need to make the link between what students do in their degree and certification programs and the professional practices specified by the standards when students begin their teaching careers.

## HOW SHOULD THE 2008 STANDARDS BE USED IN TEACHER EDUCATION?

Because the ISTE standards are also part of the NCATE accreditation process, for many teacher education programs they are not so much advisory as they are mandatory. A program must deal with these standards as they apply for and then renew NCATE accreditation. The critical importance of NETS for Teachers as a part of NCATE accreditation highlights the necessity of considering carefully how ISTE's standards are integrated into a teacher education program's curriculum development and student assessment systems. In the second edition of the manual on NETS-T (ISTE, 2008), one approach to using the standards is presented. It involves the use of analytic rubrics for each of the four performance indicators per standard to decide whether a teacher education student meets the criteria for that standard or not. The rubrics provided have four levels of accomplishment: Beginning, Developing, Proficient, and Transformative.

For example, Performance Indicator *a* for the first 2008 standard (Facilitate and Inspire Student Learning and Creativity) is: *Promote, support and model creative and Innovative thinking and inventiveness.*

The development team obviously thought that without some additional resource material it would be difficult to make a decision about whether a teacher does or does not meet a standard. The four-level rubric for this indicator includes the criteria/exemplars shown in Table 2.

Table 2 illustrates the overall approach, but before looking at the NETS-T rubrics in detail and considering their usefulness to teacher education programs, another more general point should be explored. It is whether rubrics are a highly desirable and widely applicable form of assessment and evaluation in higher education and teacher education.

Table 2. *The Beginning and Transformative Rubric for Performance Indicator of Standard 1*.

| **Beginning Level** | **Developing Level** |
|---|---|
| Research and discuss ways students can use digital tools and resources to enhance creative and innovative thinking and to develop and express their understanding of knowledge and concepts | Facilitate creative thinking and inventiveness by modeling thought processes and creating visual representations of concepts development and problem solving |
| **Proficient Level** | **Transformative Level** |
| Enable students to demonstrate creative thinking, construct knowledge, and develop innovative products and processes by promoting and supporting these activities and modeling related knowledge, skills, and attitudes | Regularly engage with students as lead learner in creative thinking activities and inspire students to explore complex issues, generate new ideas, create and critique original works, and develop and evaluate new products and processes |

## ARE RUBRICS "THE WAY TO GO?"

The rubrics presented in the 2008 guide (ISTE, 2008) are helpful and it is obvious that a great deal of effort has been invested in creating worthwhile rubrics. There is, however, a growing criticism of the use of rubrics at all levels of education. Some of the criticisms are general and aimed at what critics see as fundamental errors in the reasoning behind the use of rubrics. In the forward to a book titled, *Rethinking Rubrics in Writing Assessment* (Wilson, 2006), Alfie Kohn (2006) made some very broad and deep criticisms of rubric:

> Consistent and uniform standards are admirable, and maybe even workable, when we're talking about, say, the manufacture of DVD players. The process of trying to gauge children's understanding of ideas is a very different matter, however, and ought to be treated as such. It necessarily entails the exercise of human judgment, which is a messy, imprecise, subjective affair. Rubrics are, above all, a tool to promote standardization, to turn teachers into grading machines or at least allow them to pretend that what they're doing is efficient, exact, and objective. Frankly, I'm amazed by the number of educators whose opposition to standardized tests and standardized curricula mysteriously fails to extend

> to standardized in-class assessments.
>
> The appeal of rubrics is supposed to be their high inter-rater reliability, finally delivered to language arts—the "transformation of English classes into something as rigorous and legitimate as biology or chemistry classes," as Maja Wilson puts it. A list of criteria for what should be awarded the highest possible score when evaluating an essay is supposed to reflect near-unanimity on the part of the people who designed the rubric and is supposed to assist all those who use it to figure out (that is, to discover rather than to decide) which essays meet those criteria.
>
> Now some observers criticize rubrics because they can never deliver the promised precision; judgments ultimately turn on adjectives that are murky and end up being left to the teacher's discretion. But I worry more about the success of rubrics than their failure. Just as it's possible to raise standardized test scores, providing that you're willing to gut the curriculum and turn the school into a test-preparation factory, it's possible to get a bunch of people to agree on what rating to give an assignment, providing that they're willing to accept and apply someone else's narrow criteria for what merits that rating. Once we check our judgment at the door, we can all learn to give a 4 to exactly the same things.
>
> This attempt to deny the subjectivity of human judgment, this "fear of disagreement," as Wilson calls it, is objectionable in its own right. But it's also harmful in a very practical sense. (p. xii – xiii).

Kohn's criticisms of rubrics were echoed and explored in depth by Wilson (2006). Both authors were talking about the use of rubrics in language arts learning, but there are critiques of rubric use in higher education, and in teacher education, as well. For example, in a review of the available empirical literature on the use of rubrics in higher education Reddy & Andrade (2010) found only three empirical research studies on the academic impact of rubrics. Two were reported as positive (Petkov & Petvoka, 2006; Reitmeier, Svendsen, & Vrchota, 2004) and one was negative (Green & Bowser, 2006)). This is very thin support for such a widespread practice in higher education, and when looked at more closely the support becomes even thinner. The Reitmeier study focused on improving the communication skills of students in food science. Teachers replaced exams with several oral presentations on the food science content students were learning and gave them a rubric for the oral presentations. The rubric assessed communication of Knowledge, Sensory Evaluation, Presentation Technique, and Preparation Technique on a scale from Poor (4) to Excellent (10). Students were evaluated by other students, by themselves, and by the instructor. Although the authors reported that students did better when the rubric, the oral presentations, and the self and peer evaluations were used, no statistical tests of significance were reported. In addition, in another and very similar study, Reitmeier & Vrchota (2009) compared the impact of self assessment using rubrics versus writing a reflection for self assessment. The abstract of the paper contained the conclusion that "comments from the reflection format were more thoughtful and provided more personal information in comparison to the scoring rubric. This study demonstrated the importance of reflective material such as student thoughts and feelings "(p. 88). However, that conclusion must have been based on researcher impressions because an analysis of variance that compared the self, peer, and instructor assessments under the rubric versus the reflection methods did not support those conclusions. The end result is that while the Reitmeier, Svendsen, & Vrchota (2004) study was reported in the review as

positive for the use of rubrics in higher education, that conclusion seems to be based on very little real evidence.

The other positive study (Petrov & Petvoka, 2006) involved the creation and use of standardized rubrics across several courses in an Information Sciences degree program. One of the goals of developing the rubrics was to "measure student performance in a uniform and objective way and reaching consensus among professors" (p. 242). It is probably both more reasonable and easier to achieve such a goal in a program that emphasizes computer programming than when the focus is on less well defined and variable professional skills. For example, applying the same logic to a teacher education program would require some assumptions about the nature of teaching that are not supported by the rhetoric of the 2008 NETS – T standards. The third study (Green & Bowser, 2006), which was reported as negative in the review, described the process of developing and using a rubric for writing a literature review for students completing a master's thesis. Here again, the rubric was used in an extended format that was different from the way NETS-T rubrics are likely to be used. Green and Bowser required students to use the rubric "as a writing guide, instructors to use it to assess individual literature reviews, and evaluators [to] use it to compare literature reviews across class groups" (p. 186). In addition, the rubric was made and customized for students at the university where the researchers worked. It focused on issues and problems the researchers had encountered in previous work with the students. However, in spite of the significant amount of time devoted to developing and deploying the rubric, a t-test of ratings made by three raters on literature reviews written using the rubric versus reviews written without using the rubric was not statistically significant. (However, the authors did find that instructors at two different universities using the rubric scored their students differently with instructors at one institution providing consistently higher ratings.)

To summarize, the review of rubrics in higher education (Reddy & Andrade, 2010) raises a number of issues about rubrics including several that have not even been discussed here. Overall, there is not a yet solid foundation of empirical evidence to support the use of rubrics in higher education. This could, of course, be because good professional practice has outrun empirical research studies and that the research will follow what has become common practice. Another possible explanation is that rubrics are not effective single shot solutions to the problem of assessing some types of professional practice expertise that are taught in college and university programs like teacher education. However, they may be a useful component of broader, multifaceted efforts to enhance efforts to develop professional expertise and knowledge. Several of the reports on the use of rubrics discussed thus far involved extensive changes in the pedagogy being used such as adding self and peer review of performance as well as different forms of communicating and demonstrating professional expertise.

A third explanation of why there is less empirical support for rubrics could be because rubrics have become a bandwagon and that the empirical research as well as other forms of criticism and evaluation will follow the bandwagon phase when rubrics become the focus of more sober and evaluative attention. The coming of such a phase may be signaled by a study in teacher education.

Another recent review looked at rubrics specifically in teacher education (Jonsson & Svingby, 2007). In this *Educational Research Review* paper the authors were particularly concerned with the problem of "assessing complex competencies in a credible way" (p. 131). Jonsson & Svingby (2007) conducted a comprehensive literature review to answer three questions about rubrics:

> Does the use of rubrics enhance the reliability of scoring?
> Can rubrics facilitate valid judgment of performance assessments?
> Does the use of rubrics promote learning and/or improve instruction?

(p. 132)

In terms of inter-rater agreement the authors concluded that exact agreement was generally too low to be considered reliable. However, when rubric ratings were counted as agreeing if two raters gave the same or adjacent rating, the research indicated rubric scores have an agreement level as high as 90%. That may not be such a good outcome, however, given that many rubrics have a five point range. Also, Pearson r and Spearman rho correlations between ratings were mostly between .55 and .75 which indicates between 30% and 56% of the variance in ratings is shared. Again, this may not be high enough for judging individual students and it may not even be enough for high stakes judgments of degree and certification programs. However, Jonsson & Svingby noted that "when students do different tasks, choose their own topics or produce unique items, then reliability could be expected to be relatively low" (p. 135). This brings us once again to the issue of whether rubrics are up to the task of evaluating the learning of complex professional practices. In this instance, the issue is quite basic – can different raters agree on ratings based on rubrics? As you will see later in this paper this leads to a question of not only whether they can but whether they should.

Teacher education, and the NETS-T rubrics, attempt to rate and evaluate precisely the type of professional practice behavior that Jonsson & Svingby raise a question about. Nevertheless, the authors concluded "it seems safe to say that scoring with a rubric is probably more reliable than scoring without one" (p. 136).

On the question of whether rubrics facilitate valid judgments of performance, they were more definitive and more succinct: "Rubrics do not facilitate valid judgment of performance assessments per se" (p. 141). However, this stark assessment is based in part on what the authors felt were failures on the part of rubric developers rather than weaknesses that are inherent in all rubrics. As they put it, "valid assessment could be facilitated by using a more comprehensive framework of validity when validating the rubric, instead of focusing on only one or two aspects of validity" (p. 141). Put another way, the reviewers concluded the available evidence does not allow us to assert that rubrics help us make useful and accurate assessments of the professional behaviors of individuals such as pre-service teacher education students because multiple forms of validity have not been taken into consideration when developing and validating rubrics. Raters using rubrics can, for example, incorrectly agree on the rating different students should receive and thus make collective mistakes about their judgments of the professional practice performance of students. This may seem to conflict with the conclusion that using rubrics enhances the reliability of evaluators, but it actually highlights the basic point that you can increase the reliability of ratings without increasing the validity of those ratings. However, Jonsson and Svingby's evaluation is more nuanced than that. They believe that if developers would focus on a broader and more comprehensive effort to enhance the validity of a rubric there is every reason to believe they could be successful. To this I would add that a broadened approach to establishing the validity of rubrics could well lead researchers to alternative means of assessment such as Eisner's (1997) connoisseurship model or portfolios (Zubizaretta, 2009).

However, on the final question Jonsson and Svingby asked, whether rubrics promote learning and/or improve instruction, the reviewers concluded the research was encouraging, and they echoed something noted earlier in summarizing the review of rubric use in higher education. When used in combination with systematic efforts to encourage self assessment, rubrics may facilitate teaching and learning.

To summarize, the research on using rubrics in higher education, and in teacher education, has not been, thus far, highly supportive. The traditional "more research needs to be done" message is voiced, but research has already been done that should raise a red

flag and gives us pause about the widespread reliance on rubrics in teacher education in general, and in the assessment of how well per-service teachers are learning to use educational technologies in particular.

## ISSUES WITH THE NETS-T RUBRICS

Like many rubrics used to evaluate professional practice, many of the NETS-T rubrics are not specific enough to ensure that several informed and experienced evaluators will rank the teacher at the same level. This type of problem is so common that you might say it is virtually inherent in many rubrics when they are used to precisely evaluate professional practice, either at the pre-practice or practice level. In this section this general issue will be broken down into some of its component parts.

### *THE PROBLEM OF CHANGES IN QUALITY VERSUS CHANGES IN TYPE OF PROFESSIONAL PRACTICE*

Advocates of objective, direct assessment methods generally advise professors in all fields to create rubrics to guide the grading of projects, papers, and professional practice to make the assessment more "objective" and to help ensure that several graders will assign the same grade. There are several problems with this approach, however. When the professional practice being assessed is complex and relatively ill-structured, it is often difficult to create a four or five level rubric that describes changes in quality across those levels. Often levels are not differentiated by quality. Instead, one or more of the rubric's levels describes a different professional practice that is considered superior to the practices described in the lower levels. The NETS for Teachers rubric in Table 2 is an example of this. The Beginning level describes the teacher doing traditional *teaching* but the Transformative level requires the teacher to play the role of *lead learner.* This is a difference in type of professional practice rather than a difference in quality of the same practice. Rubric levels that describe different professional practices instead of different *qualities* of the same practice are problematic. How would you score a teacher who teaches as described in the Beginning level shown in Table 2 because she feels the students need that, but does occasionally play the *lead learner* role when she judges that to be appropriate for her students? And, suppose she plays the lead learner role more and more often across the school year? Using the rubric at the beginning of the year might result in a classification of Beginner but using it at the end of the year might indicate she is at the Transformative level - which would be outstanding professional progress over one year! This is one of many conundrums you find yourself in when the levels of a rubric describe different, even if related, professional practices instead of qualitatively different instances of the same professional practice. Unfortunately, rubrics with this problem are very, very common when the assessment of professional practice is the purpose. Wiggins (1998, quoted in Tierney and Simon, 2004) made the point that levels of performance in a rubric should be based on qualitative differences in practice, not different practices. "Although the descriptor for each scale point [level] is different from the ones before and after, the changes concern the variance of quality for the (fixed) criteria, not language that explicitly or implicitly introduces new criteria or shifts the importance of the various criteria" (p. 185).

### *ANOTHER PROBLEM WITH PROFESSIONAL PRACTICE RUBRICS: TRIVIALITY*

Unfortunately, the use of rubrics can also descend into the assessment of trivial and minor aspects of a student's work. For example, a quick search of the Internet located a

rubric to assess a lesson taught by a student teacher that included a criteria related to the "neatness" of the lesson plan. Such criteria are easier to assess than more important and professional criteria but in the busy life of a teacher educator, assessing what is easy rather than what is important is a serious temptation. In an early paper on rubrics, Popham (1997) pointed out that "many rubrics now available to educators are not instructionally beneficial" (p. 72). More recently Tierney and Simon (2004) made the same criticism of rubrics. "Unfortunately, many rubrics are still not instructionally useful because of inconsistencies in the descriptions of performance criteria across their scale levels. The most accessible rubrics, particularly those available on the Internet, contain design flaws that not only affect their instructional usefulness, but also the validity of their results." These authors also emphasize the importance of basing levels in rubrics on "levels of quality." However, to the question of whether differences in quality or differences in type of professional practice differentiate the levels of a rubric, we must also add the issue of triviality. Does the rubric focus on practices that are core and critical elements? A look at the many published rubrics that were created to assess the 2000 NETS-T standards will inform you that both problems with focus and with triviality are common in the rubrics used in teacher education. Tierney and Simon's (2004) paper is a good source of advice for those who want to develop and use rubrics to assess the ISTE standards.

## *RUBRICS AND CONFLICTS WITH FOUNDATIONAL ASSUMPTIONS: A PARADIGM CLASH*

I am not as optimistic as Tierney and Simon about rubrics, in part because the solutions to some problems are the cause of others. They express some hope that the quality of rubrics can be improved and thus made more useful and effective in a field like teacher education. I agree that the quality of rubrics could be improved. However, my doubts are not primarily about whether the typical rubrics used in teacher education can be improved technically. My doubts are based on the assertion that rubrics, as typically advocated and used in teacher education, are based on a particular paradigm of practice that is not accepted by all teacher education programs. Using rubrics sometimes contradicts the underlying assumptions that are the foundation for a particular program. For example, Tierney and Simon emphasize the importance of explicitly stating performance criteria so that they are clear to everyone. They also emphasize differentiating levels of performance by qualitative differences rather than different practices. Those guidelines do address some common problems identified in rubrics, but they can exacerbate other problems.

For example, Follendore (2006) has criticized rubrics because the detailed, explicit guidelines often do not fully represent the broad goals of the learning experience but nevertheless tend to become the focus of learning. Twenty years ago I remember observing students at many institutions developing lesson plans that rigidly adhered to Madeline Hunter's Seven Step Lesson Plan. They usually had no idea that this was one of many different ways to develop lessons, or that it was a doctrinaire expression of behaviorism that pointed them away from many innovative teaching and learning methods. All they knew was that the professor graded them on whether their lessons followed Hunter's recipe precisely. Follendore (2006) eloquently stated this same objection to many rubrics:

> What teachers should take issue with is the Institutionalization of requirements for explicit conformity in the creation of rubrics, in particular, what I, and other college professors like me, are seeing is that the use of rubrics is having decidedly detrimental effects of the

> performance of a significant cross section of students. By tying the grades to such a tightly predetermined set of expectations, students are not excelling, they are intellectually patronizing and conforming to the statistical system of what is expected of them. Some students become completely unable to function in classrooms where they are not absolutely guaranteed to make a specific grade for specific production. In other words, students become so engaged in the grade, they completely lose sight of the importance of the larger and more significant educational experience. Rubrics instill the false notion that grades are real world requirements for obtaining knowledge.
>
> It is not necessary, and nor is it beneficial for students to go through life thinking that life itself is composed of a rubric. It is simply not true that as human beings, in most areas of our lives, there is a rubric which will allow us to conform to be better and more knowledgeable thinkers. In fact it is easy to think of the best of human potential in terms of rubric breakers, not rubric thinkers. Our best intellectual minds were nonconformists who relied upon personal intuition and a love for their work. In a very real sense of the term scholar, the best of us have always been rubric breakers, not rubric conformists. ... As teachers we should validate the originality of our students. ... Rubrics are most realistic to experiential reality when they are less visible, less oppressive and open to interpretation and imagination.

It is not necessary to completely agree with Follendore to see that rubrics do present a problem to the many teacher educators who take a more holistic, artistic, and ill-structured approach to professional practice. Terms like reflective practice, constructivist teaching, teachers as civic agents (Mirra & Morrell, 2011), critical reflective practice, critical pedagogy, teaching as social justice (Ritchie, 2012; Apple, 2011), phronetic teacher education (Korthagen & Kessels, 1999) and teachers as action researchers (Wamba, 2011) are used to characterize different foundations for teacher education programs. These terms represent a few of the different foundations and paradigms for thinking about and doing teacher education. Rubrics, and other types of objective or semi-objective methods of evaluating professional practice, are more suited to certain teacher education frameworks such as technical-rational views of practice that aim at preparing teachers to provide direct instruction in the instructionist tradition (Klesius, Searls, & Zielonka, 1990).

### *ALTERNATIVE RUBRIC FORMATS THAT GO BEYOND TECHNICAL-RATIONAL FOUNDATIONS: STUDENT INVOLVEMENT AND HOLISTIC RUBRICS*

For teacher educators who do not accept technical rationality as a foundation, two variations on the use of rubrics can possibly address this issue. Both involve "adapting" or "reforming" rubrics so that they are used in ways that do not violate the foundational assumptions of teacher education programs based on paradigms other than technical-rational and instructionist models. One involves student participation in the development of rubrics. This seems particularly important in teacher education because assessment is a part of the professional practice skills students are expected to learn. In addition, the reviews of research discussed earlier suggest student involvement in the development and use of rubrics, including self and peer assessment, may be a potent aspect of rubric use in professional programs like teacher education. Student participation in the creation, adaptation, and use of rubrics is also one way to address the criticisms of Follendore and others.

Another way of addressing the criticisms is the use of "holistic" rubrics. The rubrics published with the 2008 NETS for Teachers publication (ISTE, 2008) are analytic rubrics. They break down a standard into components (performance indicators) and then create a set of criteria for deciding whether a student's performance is good or bad, high or low, and so on. *NETS for Teachers* uses four levels of performance from Beginning to Transformative. Holistic rubrics take a different approach. Mertler (2001) distinguishes holistic rubrics from analytic rubrics this way: "A holistic rubric requires the teacher to score the overall process or product as a whole, without judging the component parts separately ... . In contrast, with an analytic rubric, the teacher scores separate, individual parts of the product or performance first, then sums the individual scores to obtain a total score ... ." Holistic rubrics are thus less focused on breaking the standard down into discrete components that are assumed to constitute the standard. Instead the performance of students is evaluated holistically relative to the standard (or objective) rather than atomistically.

One issue that must be dealt with in terms of the NETS standards is that both the five standards and the four performance indicators for each standard are "fixed." ISTE has specified that you must demonstrate accomplishment of the standard through the performance indicators. This approach virtually mandates an analytic rather than a holistic approach. Even with this problem, I still find holistic rubrics a more appealing approach because of the point to be discussed next - teaching is not a technical-rational activity that lends itself to the process of breaking practice down into components that are then judged by matching performance on those components to a standardized and stable set of technical standards.

The issue of technical-rationality in teacher education has two primary components. The first has already been noted. Teaching is not a technical-rational profession in which there is an agreed upon and well-structured set of practices that should be performed when the teacher faces a well-defined and well-formed teaching context. Different approaches to teaching - constructivist, instructionist, and critical pedagogist - point teachers in different directions. There is thus no universal definition for "good" teaching, but most rubrics are based on the assumption there is. And, to make things even more complex, several theoretical approaches to professional practice, such as reflective teaching, assume that professional decisions must be thoughtfully considered every time they are made because the context of the decision is an important factor. Teacher education programs based on a model, such as reflective practice, have difficulty using analytic rubrics while maintaining adherence to the fundamental assumptions of their foundational assumptions.

Following Piaget's approach to doing research on human cognitive development, it might be more informative to ask pre-service teachers to explain *why* they did this or that when teaching a lesson rather than to simply observe them and compare their performance to a stable set of standards or reference criteria. Hatch & Grossman (2009) described a very interesting use of multimedia technology in teacher education that was based on the assumption that "teaching is a complex, situated, and ill-defined activity" (p. 73). They went on to compare this view of teaching with another perspective: "In contrast to arenas in which problems are clearly defined, with well-defined and accepted solutions across a variety of contexts, teaching encompasses a wide range of opportunities that are ill-defined and situated in particular contexts" (p. 73). A teacher education program that begins with the assumption teaching is an ill-structured and ill-defined profession will necessarily be quite different from one based on the idea that teaching involves the application of well-defined solutions to clear and well-defined problems and needs. Rubrics, like direct instruction and teacher-centered learning activities, are more a part of the instructionist than the constructivist framework for both

schooling and teacher education.

It does, therefore, make a difference whether we think teaching is better described as a fuzzy and context-dependent professional practice than as a technical-rational practice. Decisions emerge from the context of practice as well as from the theoretical framework that has been adopted by the teacher. Thus, the teacher may respond differently to situations that appear, to an uninformed outsider, virtually identical. This characteristic of our profession also makes problematic the use of rubrics to evaluate professional practice. There is not *One Right Answer* when it comes to deciding what to do in a particular teaching and learning situation, including how to integrate technology into learning. There may be many, depending on the context. This was astutely recognized by the developers of the 2008 standards in their comments about the criteria for Beginner, Developing, Proficient, and Transformative levels of the rubrics for the 20 performance indicators. "The activities described in the rubrics and scenarios are examples only, not a definitive list of activities required to meet a standard/indicator. There are many different activities and scenarios that could demonstrate achievement of the ISTE NETS for Teachers" (p. 11). This makes it clear that the "hard and fast" aspects of the standards are (1) the five standards, and (2) the four performance indicators for each standard. If we use the rubrics, and the scenarios of classroom practice provided, we should keep in mind that these are singular examples rather than guiding principles or expectations. The standards and performance indicators can be demonstrated in many other ways. This situation suggests that if we use rubrics to determine how well our students are meeting the standards, holistic rubrics may be more appropriate than analytic rubrics. Using holistic rubrics would also allow teacher education programs based on paradigms other than technical-rational instructionism to adapt and use the standards without feeling they must violate the guiding principles of their programs. And, as new paradigms emerge and begin to influence teacher education, using holistic rubrics would give those emerging and innovative programs more flexibility.

A further problem with the assessment of professional practice via rubrics, which was introduced earlier, is the oft stated goal of encouraging reliable grading. That is, with rubrics the hope is that you are more likely to obtain consistent assessments across different raters. While there is an administrative advantage to agreement across raters there is little reason to expect high reliability, except perhaps at the bottom end of the scale where poor performance is easier to agree upon. However, should we expect high reliability between raters judging practices that are not universally agreed upon? We would be surprised, for example, if all the reviewers of a new novel or play gave it the same review and rating. We do not expect uniformity because there are many sets of "standards" for evaluating novels and plays. Literary critics differ considerably in terms of which literary theory or set of standards they prefer to use which means there are often major differences in how a literary piece is judged. Evaluating teaching is much more like evaluating a new novel than it is evaluating the medical effectiveness of a new vaccine for preventing the flu. Further, if we reject the technical-rational view of teaching, we also do not expect teachers to be consistent in their professional practice because context is an important factor in judging quality of practice. Many decisions are made "on the fly" after reflecting on the unique features of the current context. Thus any system that provides a prepared set of standards that define “correct” and “incorrect” behavior in an ill-structured professional practice context should be viewed with some suspicion. Stephen Richarde (2008) has made a strong argument for the use of assessment methods that are not based on the assumption that all graders should give the same grade and his point is very relevant to this discussion of how the NETS-T should be used in teacher education.

Finally, a recent assessment of the use of rubrics in higher education by one of the

most respected authorities in higher education assessment should give us all pause. In a paper titled, "Sadly, Rubrics Are Not For Everyone," Trudy Banta (2008) made the point that rubrics are "not a sensible approach to assessing learning" in many disciplines in higher education. Also, for a humorous commentary on obviously misdirected use of rubrics in college English courses see Carolyn Foster Segal's (2007) commentary *Crossing the Rubicon* in the May 25th, 2008 issue of the *Chronicle of Higher Education.*

## SOLUTION 1: USING HOLISTIC RUBRICS IN TEACHER EDUCATION

The 2008 National Educational Technology Standards for Teachers are the most recognized, most used, and most important technology standards for American teacher education programs today, in part because they are components of the NCATE accreditation process. The standards publication (ISTE, 2008) that presents those standards also presents an approach to determining whether a program has met those standards. It involves using analytic rubrics to assess a pre-service teacher's performance on 20 different performance indicators (four for each of the five standards). Table 3 illustrates the approach.

Table 3. *The Framework for Assessing Performance Indicators on Each of the Five Standards*.

| Performance Indicator | Beginning Criteria | Developing Criteria | Proficient Criteria | Transformative Criteria |
|---|---|---|---|---|
| Indicator A | *These inner cells all contain text descriptions of the criteria for a level* | *Various levels of each indicator if the rubric is analytic* | | |
| Indicator B | | | | |
| Indicator C | | | | |
| Indicator D | | | | |

As noted earlier, a number of experts on rubrics strongly support using differences in quality as the foundation for distinguishing between different levels of performance rather than differences in type of practice. Few of the criteria in the 2008 standards for distinguishing Beginning from Developing, Developing from Proficient, and Proficient from Transformative levels of performance meet this requirement. However, one very good reason for this is that the Performance Indicators are not singular professional practices. Most are probably better considered "clusters" of professional practices, or important "areas" of practice rather than individual professional practices. Consider Performance Indicator d for Standard 4:

> *Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital-age communication and collaboration tools.*

This is a complex cluster of professional practices, rather than a single professional

practice. It is not surprising, therefore, that the criteria presented for distinguishing between Beginning, Developing, Proficient, and Transformative levels of performance are also complex and include several different professional practices. Performance Indicator d includes criteria that relate to the very broad and important areas of global awareness and cultural understanding. This complexity is an issue but it is not the problem. The problem is not that the criteria for levels are not qualitative. The problem is that the performance indicator is not a singular professional practice, nor should it be! The solution is not to convert the performance indicator to a single professional practice and make all the criteria quality based. Instead, a workable solution would be to make these rubrics holistic rather than analytic. Table 4 illustrates how this might work.

This holistic approach would eliminate the detailed criteria in the inner cells of the rubrics and, instead, adopt a holistic approach to assessing the 20 performance indicators. Holistic rubrics typically work at the objective or standards level, but the ISTE NETS for Teachers framework does not take this approach. Instead, it uses performance on the four indicators for each of the five standards to indicate performance on a particular standard. The approach implies that ratings on the four indicators are additive and should combine to determine the student's rating on the standard. The holistic approach illustrated in Table 3 is not additive. Work related to the four indicators is rated individually, but there is also a fifth category that allows students to present other evidence, and for raters to incorporate that data into their evaluation. The overall performance rating on the standard is not the result of a simple process of addition, it is another global or holistic evaluation based on all the evidence available. Thus a student could receive a very low rating on one or more of the performance indicators but still legitimately receive a very high rating on the standard (and vice versa).

Table 4. *A Holistic Approach to Rubrics for Performance Indicators for a Standard.*

| **Performance Indicators** | **Exemplars from Student Work** |
|---|---|
| Indicator 1 | Students would provide examples of their work that indicate performance on this indicator. Faculty or mentor teachers would evaluate those indicators and give a rating. |
| Indicator 2 | Faculty or mentor teacher ratings might be based on a pre-established but flexible and open categorical system such as Beginner to Transformative, or each rating might be unique, or different types of performance indicators might be used. |
| Indicator 3 | Different types of performance indicators might call for different categories of ratings (e.g., Novice to Expert, Basic to Advanced, Beginner to Master. |
| Indicator 4 | Feedback to students could be individualized and focus on their particular strengths and needs, and organized within the frameworks and paradigms adopted by the teacher education program and by the students. |
| Other Indications of Accomplishment of the Standard (5) | Students, teachers, and mentors could all provide an overall, holistic assessment of how well the student has met this standard and provide an explanation of how they arrived at their assessment. This assessment a separate holistic assessment and is not additive. |

Although this holistic approach to using a rubric was presented in a table, it would probably not work that way in practice. Based on her many years of research and consulting on student assessment in higher education, Banta (2008) believes rubrics should be replaced by portfolios in higher education. That is probably one of the best ways to implement this approach to the National Educational Technology Standards for Teachers in teacher education programs. Students would organize their portfolios so instructors and mentors could evaluate their performance on each of the twenty performance indicators as well as develop and justify an overall assessment of performance on each of the five NETS for Teachers standards.

## SUMMARY

In this paper I have focused on the question of how the ISTE NETS-T standards, and the rubrics developed for them, can be usefully integrated into teacher education programs. I have noted that there is not a great deal of positive empirical research on the use of rubrics in higher education, professional education, or teacher education. Further, there are a number of conceptual and paradigmatic objections to the use of rubrics for complex and ill-structured skills and dispositions derived from guiding paradigms that are the foundations for many teacher education programs. Those objections are mainly derived from paradigms that use terms like student-centered, constructivist, interpretive, and reflective practice to describe the foundation of a teacher education program. Or, the program is based on a foundation that uses terms like emancipation, critical theory, praxis, and critical pedagogy. Traditional analytic rubrics are not well suited to teacher education programs based on a constructivist model or a critical model. On the other hand, standards-based assessment systems that use analytic rubrics are logical and meaningful approaches to assessing the quality of teacher education programs that use terms like instructionist, teacher-centered, direct instruction, and objective to describe their foundational assumptions.

The standards and assessment movement, which developed strength and power in the K-12 environment over the past 40 years, is now becoming much more influential in American higher education. It is not likely that teacher education programs, even those based on paradigms that reject the logic of positivist forms of objective assessment, can avoid having to engage with the question of how to assess the program's success and effectiveness. Nor should they! There are, however, alternatives to the analytic rubrics used in the NETS-T documentation that are more in keeping with the foundational assumptions of many teacher education programs. One alternative is the use of holistic rubrics that are applied to portfolio evidence created by students who are given the flexibility and encouragement to provide a range of evidence that they are achieving the goals of the NETS-T standards.

Holistic rubrics applied to creatively developed portfolios is a way of maintaining program integrity while at the same time meeting accreditation and program assessment requirements and expectations. This is not, however, proposed as a singular and simple solution. It should be part of a larger and more comprehensive approach to collecting and using data that feeds directly into a system for making decisions, revisions, and improvements in a teacher education program. That topic, the systemic structures needed to institutionalize and regularize the process of collecting and using information about how well a teacher education program is doing with regard to preparing technology savvy teachers, will be addressed in a companion article that will be published in this journal. That paper will address the use of program audits for data collection and the use of a typology of pedagogies to explore the type of exposure teacher education students have to educational technology (e.g. advocate, model, teach, facilitate/mentor). That paper

will also explore in more detail how portfolios can be integrated into the process of program level assessment of teacher education using the NETS-T framework.

*Note: I completed the writing of this paper while participating in a doctoral seminar at St. John Fisher College in Rochester, NY. This paper benefited from conversations with colleagues including Dr. Claudia Edwards, Dr. Ron Valenti, Dr. Michael Robinson, Dr. Jeannine Dingus-Eason, Dr. Marie Cianca, and Dean Michael Wischnowski; I would like to express my appreciation for the opportunity to discuss a wide range of topics and issues with them. In addition, the doctoral students of "CNR Cohort 2" were active and engaged participants in the seminar, and the intellectual stimulation of their active and incisive minds were another source of both thought and inspiration about this paper and much more. Finally I would like to express my appreciation to Mrs. Katie Ryan who provided substantial editing at several points in the development of this paper.*

## REFERENCES

Apple, M. (March/April, 2011). Global crises, social justice, and teacher education. *Journal of Teacher Education, 62*(2), 222-234.

Banta, T. (2008). Sadly, rubrics are not for everyone. *Assessment Update, 20*(4).

Eisner, E. (1997). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice, 2nd ed.* Englewood Cliffs, NJ: Prentice-Hall.

Follendore, R. (2006). The problem with rubrics. Available: http://www.noisetoknowledge.com/the_problem_with_rubrics.htm

Green, R., & Bowser, M. (2006). Observations from the field: Sharing a literature review rubric. *Journal of Library Administration, 45*(1/2), 185-202. doi:10.1300/J111v45n01_10

Hatch, T. & Grossman, P. (January/February, 2009). Learning to look beyond the boundaries of representation: Using technology to examine teaching (Overview for a digital exhibition: Learning from the practice of teaching). *Journal of Teacher Education, 60,* 70-85. *doi:10.1177/0022487108328533*

International Society for Technology In Education (ISTE). (2000). NETS for teachers 2000. Eugene, OR: Author. Available: http://www.iste.org/Content/ navigationlVlenu/NETS/ForTeachers/2000Standards/NETS for Teachers 2000.htm

International Society for Technology in Education (ISTE). (2008). *National educational technology standards for teachers, 2nd. Ed.* Eugene, OR: Author.

Jonsson, A. & Svingby, G. (2007). The use of scoring rubrics: Reliability, validity, and educational consequences. *Educational Research Review, 2,* 120-144.

Klesius, J., Searls, E. & Zielonka, P. (September, 1990). A comparison of two methods of direct instruction of preservice teachers. *Journal of Teacher Education, 41*(4), 34-44.

Kohn, A. (2008). Preface. In M. Wilson, *Rethinking rubrics in writing assessment.* Portsmouth, NH: Heineman.

Korthagen, F. & Kessels, J. (May, 1999). Linking theory and practice: Changing the pedagogy of teacher education. *Educational Researcher, 28: 4-17. doi:10.3102/0013189X028004004*

Mertler, C. A. (2001). Designing scoring rubrics for your classroom. *Practical Assessment, Research & Evaluation, 7*(25). Available: http://PAREonline.net/Retvn.asp?v=7&n=25

Mirra, N. & Morrell, E. (September/October, 2011). Teachers as civic agents: Toward a critical democratic theory of urban teacher development. *Journal of Teacher Education, 62(4), 408-420.*

Petkov, D. & Petkova, O. (2006). Development of Scoring Rubrics for Projects as an Assessment Tool across an IS Program, *Journal on Issues in Informing Science and Information Technology (IISIT)*, 3, 499-509.

Popham, (1997). What's wrong - and what's right - with rubrics. *Educational Leadership, 55*, 72-75.

Reddy, Y., & Andrade, H. (2010). A review of rubric use in higher education. *Assessment & Evaluation in Higher Education*, *35*(4), 435-448. doi:10.1080/02602930902862859

Reitmeier, C. A., & Vrchota, D. A. (2009). Self-assessment of oral communication presentations in food science and nutrition. *Journal of Food Science Education*, *8*(4), 88-92. doi:10.1111/j.1541-4329.2009.00080.x

Reitmeier, C., Svendsen, L., & Vrchota, D. (2004). Improving oral communication skills of students in food science courses. *Journal of Food Science Education, 3*(2), 15-20.

Richarde, S. (July, 2008). The humanities versus interrater reliability. *Assessment Update*, 20(4), 1-10.

Ritchie, S. (March/April, 2012). Incubating and Sustaining: How teacher networks enable and support social justice education, *Journal of Teacher Education, 63*(2), *120-131.*

Segal, C. (May 25, 2007). Crossing the rubicon. *Chronicle of Higher Education: The Chronicle Review Section.*

Tierney, R. & Simon, M. (2004). What's still wrong with rubrics: Focusing on the consistency of performance criteria across scale levels. *Practical Assessment, Research & Evaluation, 9(2).*

Wamba, N. (June, 2011). Developing an alternative epistemology of practice: Teachers' action research as critical pedagogy. *Action Research, 9*(2), *162-178.*

Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance.* San Francisco: Jossey-Bass.

Wilson, M. (2006). *Rethinking rubrics in writing assessment.* Portsmouth, NH: Heineman.

Zubizaretta, J. (2009). *The learning portfolio.* San Francisco: Jossey-Bass.

## APPENDIX

Table 1. *A comparison of the standards in the first and section versions of NETS-T.*

| **2000 NETS-T Standards** | **2008 NETS-T Standards** | **Comments on Differences** |
|---|---|---|
| 1. Technology Operations and Concepts | | The 2000 standard emphasized "sound understanding of technology operations and concepts" and ability to keep abreast of "current and emerging technologies."<br><br>There is no similar 2008 standard, perhaps suggesting we have moved beyond basic computer literacy as a focus for a standard. However, some performance |

| | | |
|---|---|---|
| | | indicators for other 2008 standards require teachers to be "computer literate" and to have basic "professional literacy" in the field of education. |
| 2. Planning and Designing Learning Environments and Experiences | 2. Design and Develop Digital Age Learning Experiences and Assessments | This 2000 standard was general and speaks of designing "developmentally appropriate" and "effective" learning environments supported by technology. The 5 performance indicators for this standard emphasized acquiring, integrating, and managing the technology and the students' use of technology.<br><br>The 2008 standard is very different because it focuses on using educational technology (ET) and information technologies (IT) to accomplish an ideological purpose - support constructivist and student-centered learning as opposed to instructionist and teacher-centered learning. The performance indicators for this standard emphasize designing and adapting learning experiences that use digital tools and resources to accomplish four things: (1) "promote student learning and creativity," (2) enable all students to pursue their individual curiosities and become "active participants in setting their own educational goals, managing their own learning, and assessing their own progress," (3) "customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities," and "provide students with multiple and varied formative and summative assessments aligned with content and technology standards and using resulting data to inform learning and teaching." While not all these goals are constructivist, the tone is much more favorable toward constructivist approaches than the 2000 standard and performance indicators. |
| 3. Teaching, Learning, and the Curriculum | 1. Facilitate and Inspire Student Learning and Creativity | The 2000 standard emphasized using ET/IT to teach "content standards and student technology standards." However, there were performance indicators to support "learner-centered strategies," address "diverse needs," develop "higher-order thinking skills and creativity," and manage student learning in technology-rich environments.<br><br>The 2008 standard is much more detailed in that it specifies using technology to support a number of constructivist and student-centered learning methods: "creative and innovative thinking and inventiveness," exploring "real-world issues and solving authentic problems," promoting "student reflection using collaborative tools," and modeling "collaborative knowledge construction." |

| | | |
|---|---|---|
| 4. Assessment and Evaluation | | The 2000 Standard Four was about assessment and evaluation that generally calls for teachers to use a variety of assessment methods and to support them with ET/IT.<br><br>The 2008 standards do not include an assessment and evaluation standard, but the topic is mentioned in a performance indicator for another standard. |
| 5. Productivity and Professional Practice | 3. Model Digital-Age Work and Learning | The 2000 standard emphasizes using ET, and especially IT, to support personal professional development, to evaluate and reflect on professional practice, to increase productivity with IT/ET, and to communicate as well as collaborate with "peers, parents, and the larger community to nurture student learning."<br><br>The 2008 standard reflects the influence of globalization concepts, the teacher leader movement, and several constructivist principles including the idea that learning is a social activity. The performance indicators talk about participating in local and global learning communities, and of contributing to renewal efforts for self, others, the teaching profession, and schools. They also emphasize local or "contextual" meaning by expecting collaborative development and demonstration of "a vision of technology infusion," as well as "participating in shared decision making and community building." |
| 6. Social, Ethical, and Human Issues | 4. Promote and Model Digital Citizenship and Responsibility | The 2000 standard is relatively straightforward. It expects teachers to "understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply those principles to practice," including modeling and promoting their use by students.<br><br>The 2008 standard is considerably broader. It asserts that teachers should "understand local and global issues and responsibilities in an evolving culture and exhibit legal and ethical behavior in their professional practices." Some of the performance indicators for the 2008 standard are similar to those for the 2000 standard (e.g., "advocate, model, and teach safe, legal, and ethical use of digital information and technology" and "address the diverse needs of all learners") while others are more detailed and specific (e.g., "promote and model digital etiquette and responsible social interactions"). Some reflect the increased emphasis on globalization (e.g., develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital- |

| | | |
|---|---|---|
| | | age communication and collaboration tools"). |
| | 5.<br>Engage in Professional Growth and Development | The fifth standard of the 2008 NETS-T was broken off 2000 Standard Five and made a separate standard. The new standard is broader, emphasizes the importance of a global perspective ("participate in local and global learning communities," expects the teacher to be a leader in several ways ("exhibit leadership by demonstrating a vision of technology infusion, and participating in shared decision making and community building, and developing the leadership and technology skills of others" and "contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community"). A 2008 performance indicator also requires teachers to regularly use scholarly and professional practice resources to guide their professional decision making. |