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Underpinnings of the *Praxis*® Performance Assessment for Teachers (*PPAT*®)

Gary Sykes

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Abstract

This report provides the evidentiary basis for the *Praxis*® Performance Assessment for Teachers (*PPAT*®), a licensure examination developed by the Educational Testing Service. The PPAT requires candidates to submit evidence on four main tasks organized in relation to the instructional cycle, from planning through enactment to reflection and follow up. Scoring rubrics are employed by raters to evaluate performances on each task and this report supplies the research evidence and argument in support of the scoring rubrics and of the approach to assessment provided by the PPAT.

Key words: teacher licensure, teaching competence, teaching assessment

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This paper is a review of relevant literature supporting the claims associated with the *Praxis*® Performance Assessment for Teachers (*PPAT*®). Over the past several years, Educational Testing Service (ETS) has been developing this new licensure examination, and this paper constitutes backing for the measurement approach taken in this assessment. After a review of the primary features of the PPAT, the main principles of learning upon which this assessment is based are set forth. Then, a model of the instructional process is presented that situates the primary aspects of the PPAT assessment as these comprehend how teachers plan for, enact, and work to improve instruction. A third section addresses the theoretical basis for the development of teaching practice, which underscores one of the aims of the PPAT: to successfully launch a trajectory of steady growth and improvement in teaching. The body of the report provides the research rationale and backing for the competencies of teaching assessed in PPAT, oriented to the interactive phases of (a) planning for instruction; (b) enacting instruction; and (c) analyzing and reflecting on teaching and learning for purposes of instructional improvement. Each of the main competencies derived from review of the research literature is cross-walked with the evidence elicited in the scoring rubrics for the PPAT assessment. This cross-walk will allow the reader to see how the competency statements are reflected in the measurement approach provided by the scoring rubrics.

The PPAT Assessment

The PPAT assessment has several purposes. It is intended to support the development of teaching effectiveness, to identify strengths and areas for improvement, and to contribute to the creation of a professional development plan for preservice teachers. This latter purpose is intended to provide one basis for continuing education that extends into the first year of teaching, as novice teachers begin to enact the professional growth plan they have developed in conjunction with the PPAT assessments. This innovative aspect of the PPAT sets for teacher candidates the goal of organizing their learning and growth as they complete their student teaching experience. Each plan is unique to the individual teacher candidate and is based on self-assessment combined with feedback from program instructor and cooperating teacher. The plan assists teacher candidates in identifying goals for continuing professional development as oriented to key components of planning.

The assessments are embedded in the teacher preparation program, starting just before and moving through the final clinical experience or student teaching, and begin with a low-stakes

formative task followed by three high-stakes summative tasks. The initial formative task will be scored by the candidate's program supervisor, with the summative tasks scored by state-trained assessors. Initial licensure of teachers can be contingent on a candidate meeting the performance standard (i.e., passing or cut score) on the weighted sum of the three high-stakes tasks. The PPAT then becomes part of the set of requirements for entry to the teaching profession. The four tasks are briefly summarized below (see http://www.ets.org/ppa/test-takers/teachers/build-submit/requirements):

- Task 1—Knowledge of Students and the Learning Environment: In this task, completed during the first weeks of student teaching, candidates will demonstrate the knowledge and skills that pertain to their understanding of their classroom in regard to their students, the school, and the community and will identify implications of these factors for instruction and student learning.
- Task 2—Assessment and Data Collection to Measure and Inform Student Learning: In this task, candidates will demonstrate their understanding, analysis, and application of assessment and data collection to measure and inform student learning.
- Task 3—Designing Instruction for Student Learning: In this task, candidates will demonstrate their ability to develop instruction, including the use of technology, to facilitate student learning.
- Task 4—Implementing and Analyzing Instruction to Promote Student Learning: In this task, candidates will demonstrate their ability to plan and implement a lesson using standards-based instruction. They will also show how they are able to adjust instruction for the whole class as well as for individual students within the class and will demonstrate an understanding of reflective practice.

PPAT is embedded in the educator preparation program, with the final three tasks undertaken during the concluding, clinical portion of a program. The tasks are completed and scored sequentially throughout the student teaching experience. PPAT requires that teaching candidates develop and submit a wide range of evidence on aspects of their teaching, which is then scored according to rubrics developed for PPAT. Candidates must, for example, collect a range of information about the community, school, families, and students where they engage in their teaching field assignments. They must develop detailed plans for enacting instruction,

implement these plans, gather information about the results, and determine what subsequent modifications they might make to improve their results. They are required to identify several "focus students" and provide detailed accounts of how they understand and respond to these students' learning needs. Emphasis throughout, then, is on how novice teachers learn to build connections among (a) the academic aims and purposes of instruction and standards for learning; (b) the curricular and technology-supported materials they select and modify together with the teaching strategies and student activities they plan and enact; (c) the learning needs of their students, based on use of a range of assessments, together with approaches to adjusting their instruction to meet diverse learning needs; and (d) ongoing efforts to learn from, reflect on, and improve upon their practice, again based on assessment information of various kinds.

Rubrics for the PPAT assessment have been designed—as anchored in consensus findings from research on teaching—to evaluate the evidence submitted in response to these tasks. The tasks themselves highlight critical aspects of teaching as represented in the instructional model outlined below and in accordance with broad theories of teaching development oriented to reflective and deliberate practice along a continuum from novice to expert. The tasks and the scoring rubrics, then, portray teaching as a planful but dynamic process in which teachers are continuously responsive to the touchstones of their learning objectives, the academic content of instruction, the evolving needs of their learners, and their own practice as subject for continuous and deliberate improvement. Learners in this vision of teaching are presented as diverse in their needs and active in co-constructing their learning. Teachers not only design assessments to inform their understanding of student learning but also assist students in assessing their own learning. Students, then, are projected not as passive recipients of teaching but as agents of their own learning.

Backing for the PPAT Assessment

Three kinds of backing support examinations for entry to a profession and the basic claim associated with the "safe to practice" standard. One is logical. To claim, for example, that qualified teachers engage in a process of planning, enacting, and reflecting represents a logical claim based on a conception of intentional, rational action. The warrant is essentially an argument that teaching on the basis of careful planning is likely to yield better results than teaching that is unplanned. (Still, there may be empirical warrants associated with the particular mode of planning that is claimed to be most effective.)

A second warrant is normative, involving the value assumptions and commitments resident in a licensure exam. A claim that good teachers consult in meaningful ways with families is not based on some body of evidence demonstrating that such a practice is effective (e.g., in raising student achievement). Rather, the claim is that teachers have a duty to engage with families as part of a conception of the role of the teacher. Likewise, engagement in reflection is a widely held value premise across the professions. Here, the claims are normative.

The final warrant is empirical. For example, if one regards the provision of feedback to students as a critical practice, then that claim should be grounded in the evidence concerning how feedback can be made productive based on accumulated research on this practice (e.g., Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Shute, 2008). It is incumbent on test developers to marshal the best available evidence in support of the claims established for an assessment.

It is also important to note that claims are evaluated not only in terms of their probability in yielding student outcomes but also for their correspondence with professional standards. As John Dewey noted, teaching is an activity that, among others, must be judged both in relation to whether it is carried out in accord with standards of best practice and with respect to the learning outcomes that eventuate from such teaching. The twin criteria of success, as gauged against professional standards, and effectiveness, as gauged against the results of practice, must be jointly considered (Fenstermacher & Richardson, 2005).

The licensure standard does not involve predictive validity. Rather, it warrants that a candidate who does not possess the relevant knowledge, skills, and judgments (KSJs) should not be allowed to enter a profession. It is a conservative standard in this sense and does not extend to what might be regarded as exemplary practice. The relevant KSJs must therefore be regarded as critical to competent practice (see American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014).

Finally, the crucial issue concerns how much of what kinds of KSJs a beginning teacher must possess in order to practice effectively and responsibly. Little research to date has demarked clear distinctions between the entry-level standard and advanced practice. The recently revised Interstate Teacher Assessment and Support Consortium (InTASC) standards (Council of Chief State School Officers, 2013) provide attention to this matter, but the approach taken in these standards has not been validated empirically.

In the best of worlds, licensure exams would capture all of the KSJs deemed most critical for effective and responsible entry-level practice. In practice, this ideal is only approximated, because the full set of critical competencies may not be amenable to measurement under the constraints of time, cost, and feasibility (Kane, 2006). Among the competencies involved in teaching, the PPAT Development Team, composed of 25 educators from across the country (see the appendix for membership) emphasized the importance of careful planning, uses of assessment in teaching, and the processes involved in analyzing one's practice for purposes of improvement. Clearly, the enactment of competencies in instruction itself is also of critical importance, and this, too, is represented in the assessment through the video of practice that is submitted.

Several distinctive, theoretically informed, empirically grounded literatures inform the PPAT assessment. The material supplied here operates at a high level of abstraction, outlining the general approach taken in PPAT.

The PPAT assessment is oriented around, first, (a) a set of principles about the nature of learning that teachers must take into account. There is next (b) a model of the instructional process around which PPAT assessments are organized. And finally, there is (c) a set of assumptions about teachers' professional knowledge and development, the rudiments of which must be cultivated from the outset of entry to practice. The articulation of these elements is presented in the InTASC *Model Core Teaching Standards and Learning Progressions for Teachers* (Council of Chief State School Officers, 2013) and is broadly discussed below.

Principles of Learning

The most authoritative and widely cited guide to the nature of learning was produced by the National Research Council (NRC) over a decade ago (Bransford, Brown, & Cocking, 2000). The findings and generalizations of this report continue to be relevant in describing essential principles of learning This NRC report surfaced three broad guidelines, identified in Figure 1, that serve as touchstones for the PPAT.

Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to grasp the new concepts and information that are taught or they may learn them for purposes of a test but revert to their preconceptions outside the classroom.

To develop competence in an area of inquiry, students must (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application.

A "metacognitive" approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them.

Figure 1. **Principles of learning. Adapted from *How People Learn. Brain, Mind, Experience, and School,* by J. D. Bransford, A. L. Brown, and R. R. Cocking, 2000, pp. 14–18. Copyright 2000 by the National Academy Press.**

A deceptively simple aphorism captures the essence of these principles: "The more the student becomes the teacher and the more the teacher becomes the learner, then the more successful are the outcomes" (Hattie, 2009, p. 25). This saying draws attention to the first principle—how teachers must plan and enact their lessons based on an understanding of students' prior knowledge, interests, cultural background, and other factors that influence the course of learning (see also D. Cohen, 2011). "Teacher as learner" places a strong emphasis on the ability to assess learning in the course of teaching. Assessment consequently emerges as a critical aspect of teaching, enjoying prominence in Task 2 of the PPAT assessment.

At the same time, learners cannot think critically and creatively in the absence of content knowledge, as Hirsch (1999) and others have argued. Although the Common Core State Standards (2015a. 2015b) place emphasis on students' ability to develop arguments backed by evidence within the discourses of the disciplines, the evidence resides in the content knowledge that composes the factual basis for disciplinary knowledge. Teachers also must attend to the "big ideas" in the disciplines that help to organize facts and information into broad frameworks. The second principle from the NRC report (Bransford et al., 2000), then, draws attention to this critical matter. In science, for example, teachers must introduce features of the big ideas—in the

form of scientific models—that are not directly observable as students attempt to make sense of material activity (see, e.g., Windschitl et al., 2010).

Finally, considerable research supports as a basic goal that students become self-directed learners capable of monitoring their own thought processes, setting goals, and working to achieve them (see, e.g., Palincsar & Brown, 1984; Scardamalia, Bereiter, & Steinbach, 1984; Schoenfeld, 1983; Schonfeld, 1984, 1991; White & Frederickson, 1998). Metacognition, the third broad principle identified in the NRC report (Bransford et al., 2000), has emerged as a central feature of the learning that teachers must impart to students. Associated with this principle is opportunity for student choice and autonomy in the midst of guided instruction with the aim of fostering self-directed learning.

These principles inform the PPAT assessment in a variety of ways. Throughout the task requirements, and with particular emphasis in Task 1, candidates are asked to gather and consider how features of their students, particularly their prior knowledge and experience, serve as one starting point for planning and instruction, reflecting the first of the principles set forth by Bransford et al. (2000).

A considerable body of research associates effective teaching with knowledge of the disciplines and of teaching the disciplines (see, e.g., Ball, Thames, & Phelps, 2008; Baumert et al., 2010; Buschang, Chung, Delacruz, & Baker, 2012; Carlisle, Kelcey, Rowan, & Phelps, 2011; Hill, Rowan, & Ball, 2005; Hill et al., 2008; Kersting, Givvin, Thompson, Sangata, & Stigler, 2012; Monte-Sano & Budano, 2013; Phelps & Schilling, 2004; Sadler, Sonnert, Coyle, Cook-Smight, & Jaime, 2013). Students must acquire not only a body of facts but the conceptual or intellectual frameworks with which to organize and make sense of principles, facts, procedures, and the like. Tasks 2 and 3 require that elementary candidates demonstrate grasp of content in reading and mathematics, together with a subject area of their choice (Task 4), with an emphasis on how academic language is employed and how strategies and activities support the particular content-based goals of the lesson and the assessment used to gauge learning. These aspects of the PPAT assessment reflect the second principle stated in the NRC report (Bransford et al., 2000).

Finally, the metacognitive aspects of learning feature in how teachers monitor learning and provide feedback, pose questions, orient inquiry-related lessons, and utilize strategy instruction in reading across the curriculum (Bolhuis, 2003). Across the PPAT tasks, teachers are required to provide evidence together with explanations for how they are attending to this critical

learning goal. Overall, then, these three principles of learning provide the basis for the instructional practices that the model emphasizes and assesses.

A Model of the Instructional Process

The PPAT assessment organizes assessment around a model of the instructional process, as diagrammed in Figure 2. The instructional cycle involves a complex relationship, over varying spans of time, among planning, enacting, and reflecting upon instruction for purposes of improvement. Such a cycle might take place around a single lesson in a compressed period of time or unfold in stages over weeks and many lessons. Although Figure 2 portrays these components as operating sequentially, they also take place simultaneously as, for example, teachers implement an assessment, assess learning during instruction, and reflect in action about how assessment is working out. Further, the analysis of teaching always involves both an assessment of its outcomes in student learning and development and an appraisal of teaching quality itself. These components must be considered jointly.

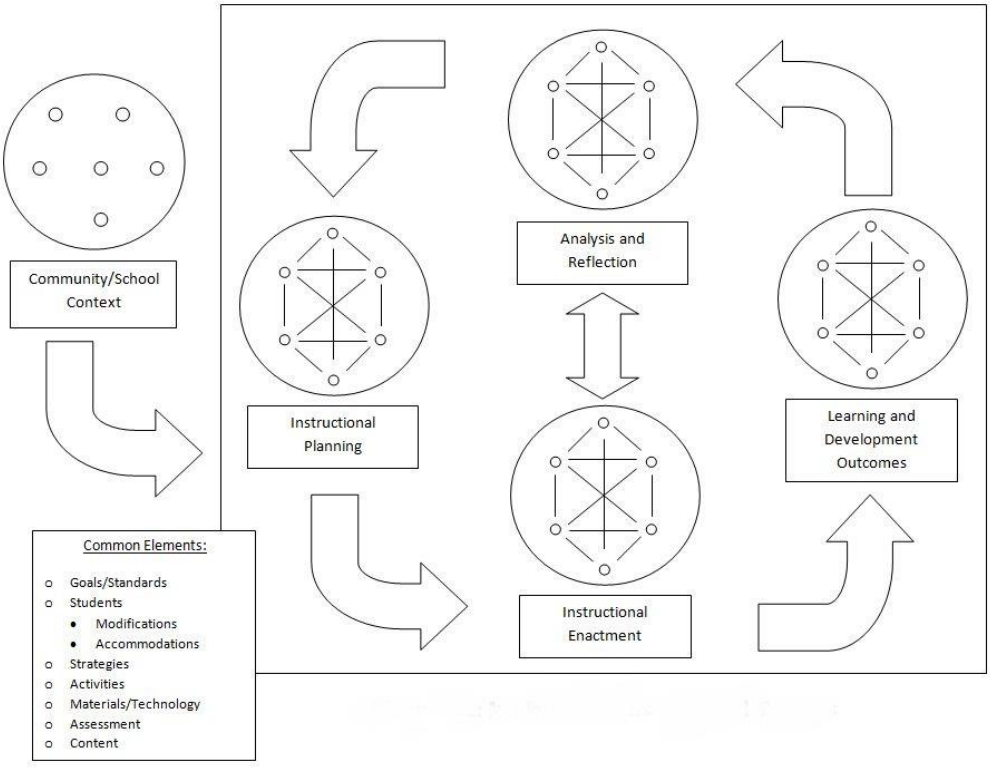

***Figure 2*. Model of the instructional process.**

The instructional cycle is always situated in a particular context that plays an important role in the process. A range of contextual factors are involved, and teachers must become cognizant of these factors and of their import for instruction, as impressed via work across the PPAT tasks.

Within each of these phases of the instructional cycle, a number of elements interact, as represented across all four of the tasks for the PPAT assessment. These elements include attending to (a) the goals and standards for learning; (b) students' characteristics as these phases influence their learning, including how teachers formulate modifications and accommodations for particular students and classes; (c) the strategies that teachers use to engage students in learning; (d) the activities that students undertake in their learning; (e) the materials of instruction that teachers select, modify, and use, including technology; (f) the assessments teachers plan for and implement in instruction; and (g) how the content of instruction is selected and represented. Each of these elements may be further decomposed into its constituent parts. The PPAT assessment places particular emphasis on the importance of assessment, a topic that has emerged in recent years as particularly critical.

The model of the instructional process is general in its orientation but specific in its application. Although some teaching skills may be treated as general or generic, such as teachers' management of the classroom, others are subject specific. For example, in order to assess whether a particular line of questioning is likely to promote student understanding, one must know specifics of the content under discussion—quadratic equations or conservation of energy, *Huckleberry Finn* or causes of the Civil War.

The model also highlights the use of technology in teaching, a topic of emerging importance about which some preliminary knowledge is emerging (see, e.g., Fishman & Dede, 2016; Shaffer, Nash, & Ruis, 2015). Here, although the research base concerning effective use of technology in the classroom is in its infancy, many states now emphasize this new development in their standards and requirements for teachers and students alike.

Development of Professional Practice

Finally, the PPAT assessment rests on a conceptualization of teaching based on two broad and compatible theoretical orientations. One treats teaching as a reflective practice (Schon, 1983); the other treats it as a form of adaptive expertise (Ericsson, 1996; Hatano & Inagaki, 1986). Each orientation informs teaching as a form of knowledge-based professional work.

In his seminal work, Donald Schon (1983) provided a portrayal of cross-professional work as reflective practice. Schon contrasted what he termed *technical rationality* with *reflection*, defined as how professionals think in action. The first refers to the application of scientifically warranted knowledge to problems of practice, whereas the second treats the ways that professionals engage complex problems of practice that are not amenable to technical solutions. Along with other professionals, teachers employ technical knowledge that enjoys empirical support in the research literature. But such knowledge is inevitably incomplete, thus requiring supplementation.

Schon (1983) went on to set forth principles and practices for what he termed *reflection in action*, which involves both tacit understanding based on acquaintance with many cases cumulated over time and distinctive forms of inquiry that the skilled practitioner undertakes "in conversation with the situation" (p. 103). The PPAT assessment is based in part on this view of professional knowledge in use. This may be seen, for example, in the assessment's explicit attention to post-lesson reflection and in the attention to focal students who serve as cases for in-depth inquiry on the part of the candidate in Tasks 2, 3, and 4. As the developmental progression in Figure 3 indicates, reflection is an advanced skill honed by long interaction of experience with inquiry. But the PPAT seeks to begin instilling in the novice awareness of and initial experience with processes of reflection as a fundamental attribute of professional practice (Korthagen & Vasalos, 2005).

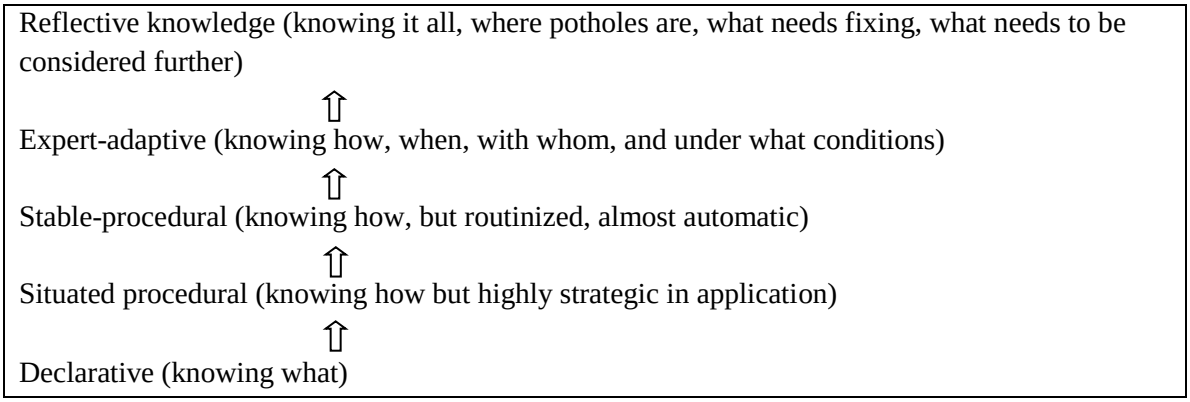

Figure 3. **A developmental model of teacher knowledge. Adapted from *Knowledge to Support the Teaching of Reading: Preparing Teachers for a Changing World,* by C. Snow, P. Griffin, and M. Burns (Eds.), 2005, pp. 210ff. Copyright 2005 by Jossey-Bass.**

Coincidentally, in the field of cognitive science, an influential set of studies emerged that contrasted the performances of novices with those of experts in a range of fields, including teaching (see, e.g., Berliner, 1992, 2001). This work gave rise to the concept of *adaptive expertise*, which refers to the way experts, given cognitively challenging situations, are better able to adapt flexibly to the unique features of a problem and develop an effective solution quickly and accurately (Ericsson, 1996; Hatano & Inagaki, 1986). This perspective also recognizes that adaptive expertise deals primarily with complex problems, rather than routine ones for which knowledge and skill may be applied with increasing automaticity. Novices, then, need both to build routines and repertoires called up fluidly for the management of common, recurring problems of practice, and to acquire skills of inquiry and reflection for work on difficult cases.

A further element in this approach to teacher development contrasts routine experts with adaptive experts, the latter capable of changing their core competencies over time and expanding the breadth and depth of their expertise. In contrast, routine experts develop core competencies and apply these over time with increasing efficiency. Development also runs risks of plateauing and failing to continue improving while also falling subject to expert blind spots, which, for example, can accompany deep knowledge of subject matter to such an extent that the teacher fails to recognize what novice learners need in order to grasp disciplinary content (see Darling-Hammond & Bransford, 2005).

In relation to teaching, novices must know how to set up and manage a classroom in the first days of schooling so that rules, routines, and procedures are specific, clear, and instilled through modeling, guided practice, reinforcement, and subsequent cueing. Expertise enters the picture when a teacher must diagnose a reading difficulty in a particular student that may fall outside the common misconceptions and difficulties the research literature has identified. Or a teacher discovers the source of social or emotional difficulty a student is experiencing and then generates a helpful response. Teaching, then, is built both on the development of automatic routines and repertoires and on the gradual development of adaptive expertise for situations in which student difficulties might not be easy to ascertain or address.

In its design, the PPAT assessment incorporates perspectives on professional knowledge and its acquisition based on these twin orientations. The claim is not that novices can or should be fully adaptive experts from the outset, for the research is clear that expertise takes

considerable time, high motivation, and varied experience to develop. For example, estimates suggest that in many fields 10,000 hours of deliberate practice underlies expert performance (see, e.g., Ericsson, 2005, 2008; Gladwell, 2008). Instead, the PPAT assessment cues novices to the importance of this orientation, setting the expectation that this is how experts think and work in practice.

One conceptual approach to knowledge development has been proposed by Snow, Griffin, and Burns (2005), as set forth in Figure 3. Note that the PPAT assesses primarily the first two levels, while inscribing the importance of the progression in the structure of tasks that require inquiry and reflection.

This discussion begins to lay out the research base for the PPAT assessment. Over the past 25 years, research on teaching has burgeoned, accompanied by its share of theoretical and ideological arguments and disagreements. But a number of contemporary syntheses recognize common practices that underlie such familiar dichotomies as direct instruction versus constructivist approaches. Effective use of teaching practices, such as modeling or scaffolding, are agnostic with respect to teaching approach or philosophy. There is a clear case, then, for concentrating entry-level practice on factors of this kind.

Research Support for the PPAT Assessment

The main claims underlying the PPAT assessment are organized below and set within the instructional cycle that organizes their relationship. The studies presented are illustrative, not exhaustive, of the research that supports the high-level claims embedded in the model. Figure 2 proposes three critical aspects of instruction—planning, enacting, and analyzing/reflecting—as these interact continuously with the learning that is unfolding among students. The review takes up these three critical aspects in turn, providing relevant references to supporting research together with background that contextualizes the research in terms of the history of inquiry, disputes within the scholarship, and other qualifications and elaborations.

As well, each of these critical elements is cross-referenced to specific evidence as identified in the PPAT scoring rubrics (see http://www.ets.org/ppa/test-takers/teachers/build-submit/requirements). For example, the claim below, that teachers "anchor plans in standards of learning and explicit goals of learning then align other elements of instruction" is referenced in Rubric 3.1.1, which specifies that the candidate's response involves "insightful identification of learning goals, content(s), content standards and/or national standards and how they will guide

the planned learning activities." Some of the claims below are referenced in more than one of the scoring rubrics, whereas all of the rubrics are indexed to one or more of the following claims.

Planning Instruction

The first set of claims takes up teachers' planning practices, an aspect of teaching on which preparation programs traditionally have concentrated. Planning should be considered as highly interactive with instruction itself, as teachers may develop lesson and unit plans, launch activities, revise their plans based on the course of learning, and continue teaching and planning over time. Assessment, analysis, and reflection are processes that link planning to instruction as teachers gather a range of information formally and informally that they use to make adjustments to their plans. Thumbnail examples are provided for these claims, just to illustrate further how the claims are instantiated.

In their planning, teachers do the following:

- Master the academic content of lessons and units in conjunction with planning to teach the content (Rubric 4.1.2, 4.2.1).
- Example: Review the relevant academic language and concepts to be employed in lessons and units.
- Use a range of context-specific information to plan for instruction, particularly in regard to students' families, backgrounds, and needs (Rubric 1.1.1, 1.1.2, 1.2.3, 3.2.1, 4.1.1).
- Example: Provide a consistent explanation for how an instructional strategy or learning activity is linked to specific knowledge of a teacher's students.
- Determine how to customize their instruction, based on knowledge of their students (Rubric 1.2.2, 3.2.1, 3.4.1, 4.1.1).
- Example: Gather a range of information about students' academic strengths and weaknesses as one basis for lesson planning.
- Identify modifications in the elements of instruction for particular students (Rubric 2.1.3, 2.2.2, 2.3.1).

- Example: Plan for modifications in assessments tailored to students' individualized learning needs.
- Anchor plans in standards of learning and explicit goals of instruction and then align other elements (e.g., materials, strategies, activities) to standards and goals (Rubric 2.2.1, 3.1.1, 4.1.1).
- Example: Adjust curriculum content and in-class assessments to better reflect particular state standards of learning.
- Employ broad theories of learning in developing their plans (Rubric 3.1.1).
- Example: Draw on insights about metacognition to design learning activities.
- Identify research-based practices to inform teaching strategies and student activities during instruction (Rubric 3.1.2).
- Example: Implement principles of reciprocal reading in small-group work.
- Identify, modify, and develop means for assessing learning in their lessons (Rubric 2.1.1, 2.1.3, 2.3.1, 3.2.1).
- Example: Prepare pattern of questions to surface student misconceptions about particular content.
- Select and adapt materials for instruction, including technology, aligned with standards and student needs (Rubric 1.2.1, 2.1.2, 3.1.4).
- Example: Select reference materials from the web to reflect learning goals and student readiness, augmenting textbook content.

Background. An early empirical literature that examined teacher planning practices naturalistically (e.g., Taylor, 1970) gradually gave way to a normative literature that invoked standards-based procedures and principles of universal design and mapping backward from explicit learning goals to instruction. This literature also recognized the need for teachers to provide clear and explicit purposes for learning to students that would both guide and motivate activity in the classroom. Three key touchstones in the literature, then, have singled out (a) identifying motivating purposes; (b) mapping backward from learning goals to activities; and (c)

determining alignment among goals, assessments, materials, and instructional activity. Then, as instruction proceeds, teachers must continue to plan based on what they are learning about students' understanding, how they must adjust and differentiate their instruction, and how they need to respond to the course of learning as it unfolds over time.

Research support. This set of claims proposes that planning is a critical aspect of good teaching and that teachers must know how to develop explicit plans for their instruction. The particular claims here are normative (professionals use research-based practices) and empirical (carefully designed studies have demonstrated the positive impact on student learning of clearly articulated learning goals). Exemplars of the literature supporting these elements of planning include Drake, Land, and Tyminski (2014); Good, Wiley, and Florez (2009); Lampert (2001); Remillard, Herbel-Eisenman, and Lloyd (2009); Taylor (1970); and Wiggins and McTigue (2005).

Enacting Instruction

Enactment refers to the practice of teaching itself, when teachers put plans into action. This second set of claims centrally involves the interaction of teachers with students around content (D. Cohen, Raudenbush, & Ball, 2003). Teachers must create a positive environment in the classroom to support learning, implement instructional strategies, launch activities for students to engage in, assess the ongoing flow of learning, and make lesson adjustments to ensure learning by all students. The main claims, together with a small set of subclaims, are indicated next.

Claim 1. During instruction, teachers create a positive environment for learning through their implementation of norms, routines, and procedures (Rubric 1.2.4, 4.2.3, 4.4.1), which include

- managing time efficiently (Example: Create smooth transitions between lesson segments);
- establishing norms for behavior (Example: Treat other students with respect);
- creating classroom running routines (Example: Pass out and require handing in student work); and
- drawing on communities-of-learning principles (Example: Teach explicit routines for collaborative work in small groups).

Background. Compliance-oriented conceptions of classroom organization and management rising out of the process–product research from the 1980s to 1990s (e.g., Good & Brophy, 2008) have been augmented more recently with sociocultural approaches that emphasize creation of learning communities within classrooms (see, e.g., Weinstein, 1999). Novices must learn, in the first instance, how to set up and establish routines for running their classes, norms for behavior, responses to misbehavior, and efficient time management. In the second instance, they must establish the bases for collaborative learning among students around discourse practices and intellectual tasks that stretch students within their zones of proximal development. These two approaches need not be antagonistic but rather should be integrated within a mature practice. Novices, though, must be able to identify and establish basic classroom management rules, norms, and routines, as assessed within Tasks 1 and 4.

Research support. A large body of literature supports teachers' work in creating positive environments for learning, moving from initial work in setting up routines and norms to the more complex and advanced work to establish disciplinary learning communities within their classrooms. See Bielaczyc and Collins (2013); Brown, Collins, and Duguid (1989); Denham and Lieberman (1980); Evertson and Weinstein (2006); Leinhardt, Weidman, and Hammond (1987); McCaslin and Good (1992); Sfard (1998); Weinstein (1999); and Weinstein, Romano, and Mignano (2010).

Claim 2. During instruction, teachers employ a range of teaching strategies to promote understanding of subject matter and acquisition of skills (Rubric 1.1.1, 3.1.2, 3.1.3, 4.1.2, 4.1.3, 4.2.1, 4.2.2); these include

- making content explicit (Example: Provide a particular representation of a mathematical concept);
- modeling skills and practices (Example: Use a think-aloud to model a reading strategy);
- scaffolding learning (Example: Partially complete a task, then elicit student completion);
- checking for understanding and monitoring student learning (Example: Conduct quick review of student work on a problem);

- providing feedback (Example: Tailor explicit feedback based on recognition of common student errors);
- facilitating participation structures (Example: Organize pair-share groupings to explore open-ended questions); and
- providing strategy use instruction (Example: Launch reciprocal reading strategies).

Background. There is no canonical set of teaching strategies, methods, or models (for compendia of models, see Joyce & Weil, 1972, and Kilbane & Milman, 2014). Teachers develop a repertoire of strategies that they then must combine into complex sequences of instructional practice, varying the methods employed at any given time. The direct instructional model, for example, refers to a particular sequence of activities that has been demonstrated to produce learning (see Hattie, 2009, p. 205). Strategy instruction in reading includes a range of methods (see Snow and Biancarosa, 2003, for an account), as do effective practices for students with disabilities (see, e.g., Swanson, 2001; Swanson, Hoskyn, & Lee, 1999). Contemporary approaches oriented around constructivist principles of learning enjoy favor but come with distinctive dilemmas that must be managed (e.g., Windschitl, 2002).

Research support. Still, some recent efforts in the field have attempted to distill a common set of practices reliably associated with student outcomes (see, e.g., Good et al., 2009; Kyriakides, Christoforou, & Charalambos, 2013; Seidel & Shavelson, 2007). Another line of work has sought to identify a set of so-called high leverage teaching practices that might be regarded as one starting point for teaching strategies (see, e.g., Ball, Sleep, Boerst, & Bass, 2009; Franke & Chan, 2007; Hatch & Grossman, 2009; TeachingWorks, 2014; Windschitl et al., 2010). Such practices as modeling, scaffolding learning, providing feedback, monitoring for results, using guided practice, explicit instruction, and others have broad applicability across grade levels and content areas, although they receive specific instantiation in the disciplines. For example, a teaching strategy such as offering instructional explanations requires deep knowledge of specific subject matter and will differ in the particulars depending on the subject (see, e.g., Leinhardt, 2001).

Claim 3. During instruction, teachers induct students into meaningful and appropriate uses of academic language that provide the key concepts and "big ideas" in the subject matters of instruction (Rubric 4.2.1); this includes

- making content explicit (Example: Employ the principles of explicit strategy instruction in a reading or mathematics lesson);
- recognizing common and distinctive patterns of student thinking in subject matter domains (Example: Identify common student misconceptions and preconceptions associated with particular topics in mathematics and science);
- identifying and implementing instructional responses to such patterns of thinking (Example: Introduce a new task for a student that helps clarify a particular problem that has emerged in the student's thinking); and
- creating discourse opportunities in the disciplines (Example: Employ whole-class discussion to improve students' ability to interpret texts of various kinds).

Background. Scholarship across the disciplines has emphasized teachers' capability in making academic content explicit for students (Archer & Hughes, 2011; Bangert-Drowns & Bankert, 1990; Marin & Halpern, 2011; Pearson & Dole, 1987). Teachers do this through a wide variety of methods, but the emphasis on "explicitness" signals how teachers use academic language carefully with students, assisting students to do this as well (Bailey & Butler, 2003; Leinhardt & Steele, 2005; Schleppegrell, 2013). Academic language is important because it provides for conceptual understanding of subject matter, one of the key goals in contemporary standards of learning. Further, this competence also taps into how teachers elicit student thinking as a basis for recognizing common patterns in student thinking, then develop instructional responses that help bridge between student thinking and conceptual grasp of the subject matter. In making content explicit, teachers employ a range of discourse strategies that include structured lectures with questions, initiate–respond–evaluate (IRE) interchanges, and whole- and small-group discussions. General guidance here calls for teachers to employ a mix and balance of discursive practices rather than relying solely on one or two patterns. In particular, contemporary scholarship on teaching emphasizes the importance of discussion-based teaching as a critical means for promoting higher order thinking skills and conceptual understanding of subject matter. At the same time, the research has revealed that such teaching is complex and demanding for the teacher. A novice would not be expected to command the knowledge and skill to manage disciplinary discussions from the outset of practice. But the beginning teacher should

have some facility with a range of discursive practices for building disciplinary knowledge as encoded in the academic language that provides key concepts and main ideas in the disciplines.

Research support. In addition to the literature just cited, support for these critical competencies includes Applebee, Langer, Nystrand, and Gamoran (2003); Gonzalez, Moll, and Amanti (2005); Greenleaf, Schoenbach, Cziko, and Mueller (2001); Lee (2007); Mercer (1995); Resnick, Asterhan, & Clarke (2015); Resnick, Michaels, and O'Connor (2010); Stein, Engle, Smith, and Hughes (2008); and Walshaw and Anthony (2008).

Claim 4. During instruction, teachers implement a range of student activities to promote academic engagement on the part of all students in the classroom (Rubric 4.1.2, 4.2.1); this includes

- providing high cognitive demand tasks (Example: Select mathematical tasks oriented to students' learning progressions);
- engaging students with authentic learning tasks (Example: Create a real-world problem for extended student work in the social studies);
- utilizing multiple participation structures, when appropriate (Example: Vary whole-class, small-group, and paired-student discussions);
- creating opportunities for student-initiated inquiry and choice (Example: Within a structured writing assignment, offer students choice of topics); and
- providing opportunities for guided practice (Example: Have students practice a metacognitive strategy to guide their reading).

Background. "Student activities" refers to the academic work that teachers engage students in. The task has emerged as a critical element with an emphasis on tasks that feature appropriate but high cognitive demand, are authentic, connect with students' prior knowledge, offer student choice over aspects of the academic work, and build bridges to students' personal and cultural experiences. For building cognitive and metacognitive skills, students also need opportunities for practice, with the teacher providing facilitation and guidance.

A critical aim here is to promote student engagement, a concept that has received increasing attention in the research literature. Engagement is defined in various ways, for example, as "the attention, interest, investment, and effort students expend in the work of

learning" (Marks, 2000, pp. 154–155). Activities, then, must also supply motivation for learning as part of their worth. In inquiry-oriented science instruction, for example, the teacher might propose an intriguing problem around which to launch student explorations, hypotheses, experiments, arguments, and gradual movement toward conceptually based new knowledge. The launching problem, then, must draw students into authentic inquiry activities.

Research support. Research supporting these practices is broad based, encompassing a range of topics and issues. Following are some of the most widely cited references: E. Cohen (1994); Doyle (1983); Good and Brophy (2008); Marks (2000); Newmann & Associates (1996); Stein, Grover, and Henningsen (1996); and Stein and Lane (1996).

Claim 5. During instruction, teachers enact assessment practices to serve multiple purposes (Rubric 2.1.1, 2.1.2, 2.1.3, 2.3.2, 4.3.1, 4.4.2); these include

- selecting assessment tasks that embody learning goals (Example: Align a mathematics task with content and process goals);
- employing learning progressions in assessment design (Example: Use a documented progression in early literacy to plan a lesson);
- gauging students' prior knowledge as a basis for continuing instruction (Example: Use the know–want–learn (KWL) technique to elicit and respond to student understanding);
- developing transparent rubrics to evaluate student work, including peer assessments (Example: Create performance descriptors for grading a student essay);
- analyzing student work to identify errors, misconceptions, and openings for continuing instruction (Example: Use knowledge of common errors on mathematical tasks to interpret student utterances and work)
- integrating student self-assessment into overall assessment practice (Example: Provide for student-initiated feedback to peers on their writing);
- employing assessment data to evaluate own teaching (Example: Study student tasks to determine levels of interest and character of student thinking);

- drawing on best practices in grading students; avoid negative effects of grading policies and practices (Example: Provide diverse opportunities to demonstrate mastery); and
- using large-scale assessment data to improve instruction (Example: Study external testing results for patterns that indicate where improvement is needed).

Background. Formative assessment has emerged as a critical aspect of teaching practice. Formative assessment is defined as "a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes" (Council of Chief State School Officers, 2008, p. 1). To promote cognitive and metacognitive development, teachers must be able to track the course or progression of learning within whole classes of students and for individual students. Then, based on appraisals of learning, teachers must modify and adapt instruction to promote further learning. Teachers must be able to elicit student thinking, recognize common patterns of error or misconceptions, and formulate an instructional response. Teachers engage students in self-assessment and support the development of metacognitive thinking. Teachers also support students' development as a community of learners by structuring and scaffolding peer assessment and feedback opportunities. Teachers gather information about students in ways ranging from analysis of formal, summative assessments to informal interactions around prompts, questions, and student work. Teachers also must take care to implement grading policies that avoid negative consequences and promote student motivation and understanding. Finally, they also must be able to use data appropriately from large-scale assessments to make longer-cycle instructional adjustments and to improve their instruction.

Research support. Critical references here include Black and Wiliam (1998); Brookhart (2011); Mandanich and Gummer (2013); Shepard (2001, 2005); and Supovitz (2012).

Claim 6. During instruction, teachers provide modifications and accommodations to meet particular student needs (Rubric 2.1.3, 2.3.1, 2.3.2, 3.1.1, 3.2.1, 3.3.1, 3.3.2); this includes

- employing response-to-intervention (RTI) principles in the classroom (Example: Employ assessments to determine what interventions to recommend for students with mild impairments);

- reviewing individualized education programs (IEPs) and implementing accommodations (Example: Review and be prepared to implement required accommodations as indicated on IEPs); and
- introducing accommodations for English language learners (Example: Provide extra help in explaining key disciplinary terms).

Background. Entry-level teachers must understand their obligations regarding IEPs for students in their classroom and understand the rudiments of the RTI frameworks that orient work with special needs students in the regular classroom. These teachers also must begin learning how to collaborate with special education teachers and other personnel concerning the academic learning of special needs students. And they must begin developing a repertoire of strategies for teaching academic content to English language learners. Novices are not expected to have evolved sophisticated practices in this regard but to be aware of their responsibilities and to have some initial strategies to employ.

Research support. References in support include Gersten, Baker, and Pugach (2001); InTASC (2001); Schleppegrell (2009); Swanson (2001); Swanson et al. (1999); and Turkan, Croft, Bicknell, and Barnes (2012).

Analyzing and Reflecting on Instruction and Student Learning

The third major aspect of teaching that operates in continuous interaction with the other two aspects—planning and enactment—involves how teachers analyze their instruction for purposes of improvement. Teachers use assessments both as a gauge of student learning and as one source of evidence for examining their instructional practice. Teachers also examine their practice directly, for example, by looking at videotape of themselves teaching. They may use student surveys that provide information to them that is relevant to appraisals of instruction. Teachers gain in their capability for analyzing their instruction with experience, but PPAT promotes this activity as a basic professional disposition that is launched from the very beginning of learning to teach.

Claim 1. In and around instruction, teachers analyze student data as the basis for adjusting instruction (Rubric 2.3.1, 2.3.2, 3.4.1, 3.4.2, 4.4.1, 4.4.2)

- for individual learners (Example: Examine student work sample as basis for further instruction); and

- for whole classes of students (Example: Review evidence from summative test as basis for needed reteaching).

Claim 2. In and around instruction, teachers develop plans for continuing instructional improvement (Rubric 3.4.2, 4.4.1, 4.4.2) (Example: Based on review of evidence of student learning, make alterations to one or more instructional elements that appear to be ineffective).

Background. As indicated above, the main theoretical orientations to this aspect of teaching have been oriented around the concept of reflection and of adaptive expertise. Teachers learn to employ a wide range of effective routines in their work, such as passing in and returning student work, and one form of improvement involves becoming more fluid and flexible in their use of routines. But teachers also engage in deliberate efforts to expand their repertoires, acquire new practices, and retire practices that do not appear to have payoff in student learning. Both forms of improvement oriented to routine and nonroutine aspects of practice are implicated as teachers progressively refine and improve their practice in response to a wide range of information about teaching and learning.

Research support. Critical references here include Berliner (1992, 2001), Ericsson (1996), and Schon (1983, 1987).

Conclusion

The work reported here represents main trends in research on teaching, which have been strongly influenced by key principles derived from contemporary learning theories. The instructional model itself is grounded in a basic logic of teaching. Claims concerning teachers' responsibilities to be planful and reflective in their practice refer to basic normative commitments built into the meaning of professional work. And the more specific claims concerning teaching practice—such as the emerging significance of assessment in teaching—reflect recent advances in the empirical literature undergirding teaching. The construction of PPAT was directed toward certain aspects of teaching, such as the use of modeling and strategy instruction, by priorities established by the profession and by the InTASC standards for teaching. Accordingly, initial validation work involved a study on the alignment of PPAT content to the InTASC standards by panels of expert educators (Reese, Tannenbaum, & Kuku, 2015). This report, then, provides one form of warrant for the PPAT assessment to be joined with these other forms together with continuing study of the PPAT and its use in licensure. As new knowledge

continues to accumulate about effective teaching, the PPAT assessment will be revised to keep current with best practices and knowledge-based professional consensus.

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