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MOVING BEYOND THE “GET IT OR DON’T” CONCEPTION OF FORMATIVE ASSESSMENT

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This article proposes a model of formative assessment grounded in Vygotsky’s theory of concept formation and argues that this model can provide a useful framework for facilitating a beginning teacher’s continued learning. The model is used to argue that beginning teachers need to know how to recognize, describe, and use students’ prior knowledge not only in terms of whether students get the academic concept but also in terms of the valuable, experience-based aspects of what students do know. The author demonstrates the model’s utility by describing the results of a 3-year classroom research study on preservice teachers’ conceptions of students’ prior knowledge and formative assessment. A “get it or don’t” conception was commonly used by preservice teachers and was found to have serious impacts on their instructional practices. The article concludes by exploring the potential of a theory-enhanced model of formative assessment for teacher educators’ own instructional practices.

Keywords: *action research; educational reform; inquiry; teachers’ knowledge and beliefs; theories of teacher education*

In this article I address the question of what a beginning teacher needs to know from the perspective of a teacher educator. Of the many things a beginning teacher needs to know, I focus on formative assessment because it has broad application for K-12 students’ emotional, intellectual, linguistic, and personal development.¹ I argue that beginning teachers need to know how to elicit, interpret, and use students’ existing knowledge and experiences, a process that is difficult to understand and even more difficult to practice. Formative assessment is an example of a teaching practice that preservice teachers often learn as disconnected from a particular theory of student learning. I argue in favor of a theory-enhanced model of formative assessment as a mechanism for helping teacher educators help preservice teachers move

beyond the common “get it or don’t” conception of formative assessment.

I begin with a vignette that describes a preservice teacher’s actual practices in a practicum-based teaching situation. I then describe Vygotsky’s (1986) theory of concept formation, apply it to formative assessment practice, and present a model of formative assessment that is grounded in Vygotsky’s theory of concept formation. This is followed by a discussion of results from my own classroom research involving preservice elementary teachers’ common conceptions, such as the get it or don’t conception of students’ prior knowledge and its role in the formative assessment process. I conclude by suggesting that a model of formative assessment that is grounded in a theory of concept formation can help preservice

teachers move beyond the get it or don't conception of student prior knowledge.

DANIEL: A PRESERVICE TEACHER'S CONCEPTIONS

Daniel was a preservice teacher in my elementary science methods course. As a part of a cumulative six-part, practicum-based assignment, he designed and adapted a fourth-grade unit on the moon and implemented a lesson on lunar phases in his fourth-grade practicum classroom. In the final part of the written assignment, he stated, "Based on my pre-assessment strategy, I knew that my classroom had very little working knowledge about the scientific explanation of things pertaining to the lesson I taught (lunar phases)." He went on to discuss his preassessment results, which revealed among other things that "of twenty-four students, twenty-two thought that the moon does not give off light like the sun. . . . Of the twenty-two who believed the moon glows by different means, only one could offer an explanation."

However, instead of using this prior knowledge he had identified, Daniel ended up using his conclusion that his "students had very little working knowledge" to justify a didactic introduction to lunar phases, complete with a chalkboard diagram of relative positions and the rotation of the earth as a means for providing the "background knowledge" necessary for his students to understand lunar phases. This is somewhat baffling because the lesson he intended to teach was designed to motivate students to learn about lunar phases. He intended to have students use a certain Web site to find the phase of the moon on their birthdays and print out the picture.² Students would then work in groups to put their birthday moons in an order that made sense to them, accounting for multiple occurrences of the same shape. This would lead to a discussion about why there are varied shapes that the moon seems to take and why specific shapes seem to recur. However, Daniel abandoned this lesson in response to his interpretation that the students had little working knowledge about lunar phases.

In the preceding example, Daniel's preassessment data reveal that nearly 92% of his class had the idea that the moon is not a source of light; however, Daniel did not consider this to be a "scientific" idea about lunar phases. Although the idea that the moon is not a source of light is not a complete explanation of lunar phases, it is valuable for both the teacher and the students toward the further development of the lunar phase concept. These students were in a position of moving from their prior knowledge that the moon was not a source of light toward the concept of the sun as a light source, the concept of reflection, and how people see things. These concepts are central to understanding lunar phases. Daniel's students' prior knowledge that the moon was not a source of light could have been incredibly useful for his further instruction and for students' learning. Had Daniel recognized this, he could have designed a subsequent lesson based on the question, If the moon does not give off light, then why does the moon glow? This activity might include several opportunities for students to consider other possible explanations for why the moon glows and could guide them toward considering the sun as a possible explanation. Although this would be only the beginning of the development of the concept of lunar phases, it could provide opportunities for students to use their own ideas to iteratively construct a model of lunar phases. Why did Daniel abandon his initial lesson ideas, and his understanding of what students did know, in favor of his conclusion that students did not know anything scientific, followed by a 30-minute chalkboard lecture?

Daniel's case raises questions not only about how novice teachers come to understand how their students develop concepts but also how they themselves come to understand teaching practices designed to use students' prior knowledge to facilitate students' conceptual development. In the example, Daniel used the practice of preassessment effectively to elicit students' relevant prior knowledge. However, Daniel's understanding of preassessment was not integrated with a theory of conceptual develop-

ment. As a result, he seemed to hold both the notion of preassessment and a notion of student conceptual development as discrete entities having little or no relationship to one another.³

In the remainder of this article, I argue that a beginning teacher needs to know not just a set of theories of student learning and a set of useful teaching practices. Instead, a beginning teacher needs to understand how to integrate a specific learning theory with a specific teaching practice to facilitate conceptual development among students. I focus specifically on the practice of formative assessment (Atkin, Black, & Coffey, 2001), the process of eliciting and using student prior knowledge in instruction, because it has far-reaching implications for students' development. I focus specifically on Vygotsky's (1986) theory of concept formation because it contains both individual-cognitive and sociocultural aspects, and it can help teachers think of students' development of academic language and concepts and their development and use of their own lived experiences as a single learning process. To make the point that a theory of learning must be embedded in a teacher's understanding of formative assessment practice, I discuss findings from a 3-year classroom research study on preservice teachers' conceptions of students' prior knowledge and the formative assessment process. I demonstrate that preservice teachers in the study learned and implemented all the parts of the formative assessment process (i.e., goal identification, assessment, and feedback), but this process was filtered through their own prior conceptions of student knowledge and their own tacit theories of how students learn. I then argue that one thing that could be enhanced in teacher preparation in general, and in my class specifically, is the integration of the concept of formative assessment with Vygotsky's theory of concept formation so that the practice and the theory are largely indistinguishable from one another. If preservice teachers perceive of formative assessment as a tool to enhance the formation of concepts rather than solely as a sequence of steps, they will be in a better position to elicit and use student prior knowledge to facilitate

conceptual development. I conclude with a discussion of how as teacher educators we can use Vygotskian theory as it pertains to our own practice of formative assessment to define for ourselves what a beginning teacher needs to know.

THEORETICAL FOUNDATION

Contemporary notions of learning typically hold that a learner has prior knowledge that can be useful for instruction (Fosnot, 1996; Greeno, Collins, & Resnick, 1996; National Research Council, 2000). Terms such as *prior knowledge* and *misconceptions* have been used in the literature to refer to the types of ideas that students bring to a learning situation. I use the term *prior knowledge* to refer to learners' ideas that may or may not be fully aligned with a formal academic knowledge base. Prior knowledge consists of both experience-based concepts (EBCs) and concepts developed through formal schooling.

Although there exist many theoretical perspectives that support the value of prior knowledge in learning, I focus on Vygotsky's (1986) theory because it involves both formal academic concepts (ACs) and EBCs as playing active, mutable, and equivalent roles. According to Vygotsky, learning takes place when formal ACs presented through schooling are transformed and connected by the learner to his or her own experiences. At the same time, the learner's EBCs are brought to his or her own conscious comprehension, increasingly abstracted from the concrete experience to which they are tied, rendering them usable in a greater variety of situations. Although these two processes are fundamentally different, they interact and mediate one another. The term *experience-based concept* or EBC is used here to refer to those ideas that have been developed through, and are tied to, a learner's concrete experiences.⁴ An example is the concept of "brother." Children often know what a brother is, can show you who their brother is, and can point out a friend's brother. However, children would have more difficulty articulating academically the meaning of the concept in terms of kinship relations. The term

formal academic concept or AC is used to refer to canonical concepts of a discipline, which are abstracted from particular instances but applicable to many contexts and are useful for this reason. An example of an AC is $\vec{F} = m\vec{a}$, or the notion that force is proportional to acceleration. In schools, ACs are often appropriated by students only as language and symbols, without the conceptual aspect that must be connected to their own experience-based understandings of how the world works. ACs can be considered as shared by a community of practice and are typically the subject of formal, school-based instruction.

According to Vygotsky (1986), the role of schooling is to help the learner become aware of his or her EBCs, abstract them from the particular experiences to which they are tied, and ultimately generalize them so that they are useable in a broad array of possibilities, including communication with others who identify as members of a specific community. At the same time, schooling should provide opportunities for the learner to “try on” or “try out” formal concepts and associated language even when the learner does not fully understand them. In doing so, both EBCs and ACs are transformed (with respect to one another) in ways that make sense to the learner and ultimately with respect to what he or she perceives as the broader community represented by this discourse. Hence, at a given point in time, the prior knowledge that a learner articulates, writes, or practices is likely some combination of EBCs and ACs. This prior knowledge may therefore appear to be vague, fragmented, and even bizarre to a teacher but nonetheless represents the process of learning.

Because prior knowledge often represents an intermediate state of understanding of a particular concept, it can be useful to both the teacher and the student for further learning. Recognizing, describing, and using students’ prior knowledge in instruction is the formative assessment process. According to the formative assessment process, learning is the process by which the teacher sets a goal, typically based on a formal concept, and then proceeds to inquire into what students are thinking with respect to that topic at a given point in time. The teacher

then uses her or his understanding of students’ prior knowledge to set intermediate goals and craft activities and responses that can help students recognize and use their ideas.

FORMATIVE ASSESSMENT

Contemporary models of teaching and learning include formative assessment as a crucial element of relevant instruction (Shepard et al., 2005). The formative assessment process relies on the recognition of potentially useful ideas that students articulate. Formative assessment is commonly presented in teacher preparation programs as the process of goal identification, assessment, and feedback (Atkin et al., 2001). More specific, the process of formative assessment is the process by which a teacher asks the questions Where are you trying to go? Where are you now? How can you get there? This model is often presented to preservice teachers as classroom process that takes place between a teacher and students. Through this process, the teacher learns about students’ conceptual understandings at given points in time and, therefore, becomes better equipped to help students move further in their understandings with respect to an academic objective. At the same time, students become more aware of their current knowledge state and are in a better position to move toward the objectives that have been articulated by the teacher.

The preceding representation of the formative assessment process is not adequate for preparing teachers for the practice of formative assessment because it is decontextualized from the theory that drives it. In a similar manner, a theory of conceptual development such as Vygotsky’s (1986) theory of concept formation is not adequate on its own to prepare teachers to facilitate conceptual development among their students. Even if preservice teachers have taken an excellent educational psychology course, and understand various theories of learning and conceptual development, they still need help coordinating their preferred learning theory with the practices taught in their methods courses. Theory and practice should not be taught as separate entities; it is the responsibility of teacher education programs to ensure that

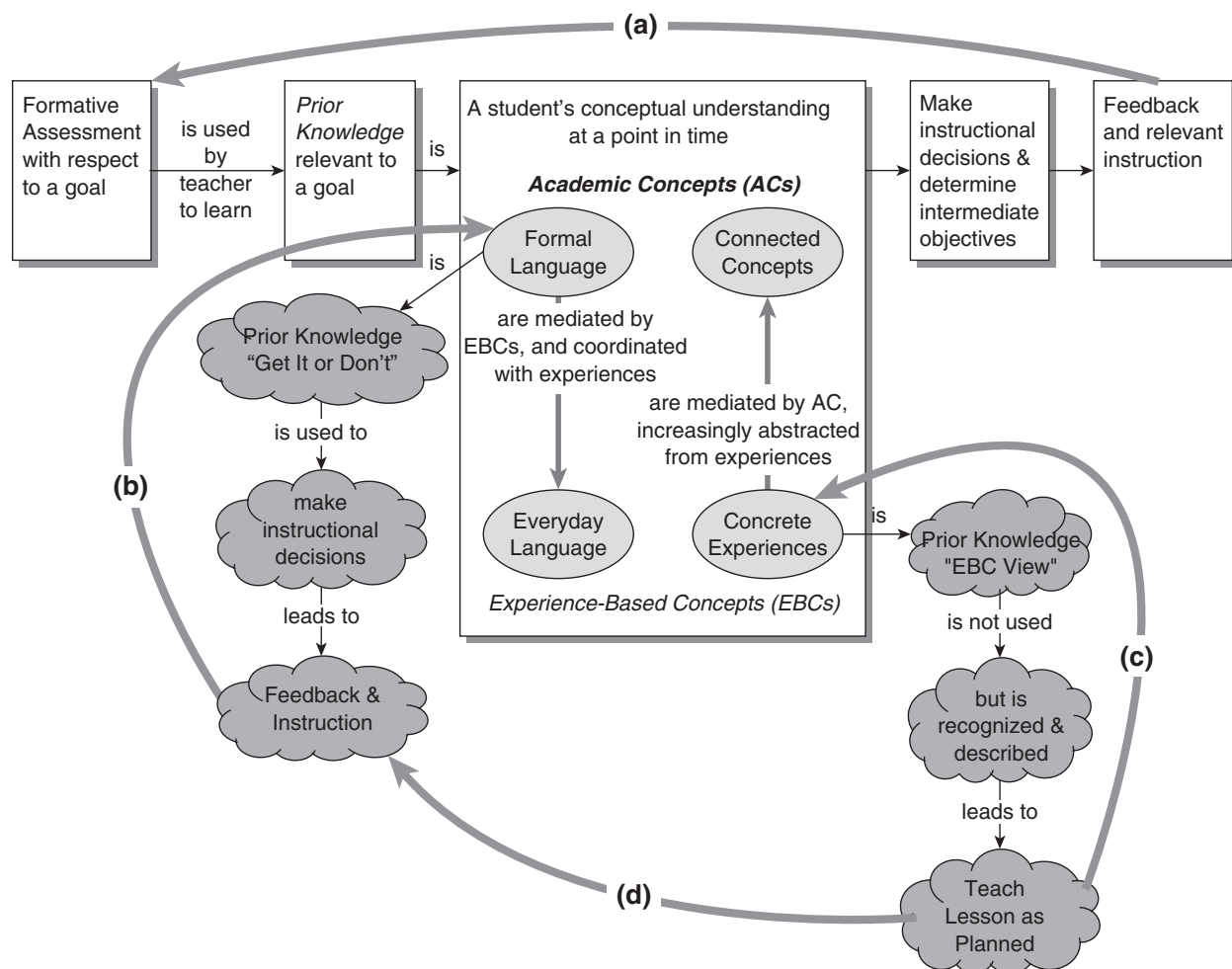


FIGURE 1: A Theory-Enhanced Model of Formative Assessment (Black Arrows) With Preservice Teachers' Common Conceptions Superimposed as Thought Clouds and Gray Arrows

preservice teachers have explicit opportunities to integrate learning theories with teaching practices and prior educational experiences in a way that makes sense to them. To do so, teacher educators must ask themselves about preservice teachers, Where are you now?—What do preservice teachers know about the concepts we are promoting in our teacher education programs?

In the following section, I discuss the results of a research study on preservice teachers' conceptions of formative assessment and students' prior knowledge. The research was done in my elementary science theory and methods course in which one of the main objectives was to help preservice teachers develop a conceptual

understanding of the formative assessment process so that they would be able to elicit and use students' prior knowledge in their own instruction.

RESEARCH RESULTS: PRESERVICE TEACHERS' CONCEPTIONS OF PRIOR KNOWLEDGE AND ASSESSMENT

The theory-enhanced model of formative assessment presented below was developed as a result of a 3-year classroom research study on preservice teachers' conceptions of students' prior knowledge and formative assessment. The preservice teachers ($n = 61$) who participated in this study were enrolled in my elemen-

tary science theory and methods course during their second semester of a cohort-based, master's level certification program.

Results of the study reveal that preservice teachers held a limited number of common conceptions of students' prior knowledge and formative assessment. Figure 1 represents the four different conceptions of the formative assessment and student prior knowledge that emerged in the data: (a) a model of formative assessment, (b) the "get it or don't" conception, (c) the "experience-based knowledge" conception, and (d) a mixed conception of formative assessment and student prior knowledge path (a) shown in Figure 1 is the model that was the goal of my instruction and is represented with black arrows. The other three paths represent preservice teachers' conceptions of the formative assessment and student prior knowledge and are represented with gray arrows. Each of these four conceptions is described in more detail below.

A Theory-Enhanced Model of Formative Assessment

Path a in Figure 1 represents the way I conceptualize formative assessment through the lens of Vygotsky's (1986) theory of concept formation. Although this is the same conceptualization I had throughout the study, the integrated nature of the theory and the practice remained largely tacit in my instruction. Path a depicts the process of eliciting students' prior knowledge, which is usually a combination of ACs and EBCs. The teacher uses her or his understanding of students' prior knowledge to make instructional decisions that lead to the development of intermediate objectives, feedback, and relevant instruction. These steps are repeated throughout the learning process. This conceptualization of the formative assessment process relies on the teacher's skills in recognizing the ideas that students articulate as resources for further learning (Hammer, 2000), and the teacher must hold a conception of students' prior knowledge as consisting of both ACs and EBCs, which are mediated by one another throughout a student's formal and

informal learning experiences (represented by hatched arrows in Figure 1). A student's prior knowledge is his or her conceptual understanding at a given point in time, whether it is aligned with the discipline-specific academic knowledge base or not.⁵ Path a also requires that a teacher is skilled at crafting activities and responses that help students become aware of and build on their ideas. To do this, a teacher must understand that there are many intermediate (hybrid)⁶ concepts that may look wrong in comparison to the formal AC but usually represent the process of understanding. Some preservice teachers followed the formative assessment path represented by Path a. It is interesting that most of the preservice teachers who did this had extensive experience working with children in formal instructional environments. A greater percentage of preservice teachers demonstrated an understanding of one or more of the paths described below. Each path represents a fact of the formative assessment process.

The Get It or Don't Conception of Student Prior Knowledge and Formative Assessment

Path b in Figure 1 is associated with the sequence of thought clouds extending from the box representing ACs. This path represents "the get it or don't conception" that preservice teachers articulated and practiced at various points throughout each semester of the course. It was common for preservice teachers to conceive of, and define for themselves, the term *prior knowledge* to mean correct, formal ACs that students do or do not have. They then interpreted the concept of formative assessment as the process by which the teacher determines whether students "get" the AC about to be taught. If students did already get it, then preservice teachers concluded that they did not have to teach it, and if they did not get it, preservice teachers concluded that the lesson was appropriate and they should continue as planned.

The get it or don't conception is very different from the model's target conception of student prior knowledge, which focuses on what students do know at a given point in time and for-

matively uses this to make instructional decisions and provide feedback. The get it or don't conception of student prior knowledge fell into two categories. The first was a vocabulary-based view of student prior knowledge, whereby if a student was unable to state the correct, academic terminology associated with a concept, then preservice teachers concluded that the student knew nothing about that concept. For example, a preservice teacher concluded that her students knew nothing about matter because they were unable to write "matter is anything that has weight and takes up space." She did not account for the varied experiences students might have with melting icicles, mud, water, evaporation, steam, or solids.

The second category of the get it or don't conception involves preservice teachers defining prior knowledge in terms of correct, academic, *background knowledge* that students have correctly appropriated from prior instruction. These preservice teachers conceptualized student prior knowledge as ACs in terms of "if it was taught, then it was learned." For example, a preservice teacher stated, "I knew that they would not know anything about matter because they were not taught this in their previous grade level." Alternatively, a preservice teacher stated, "I know that my [fourth grade] students will have prior knowledge about ecosystems, because this topic is addressed in third grade." These two get it or don't views do not account for the valuable EBCs that students have established throughout their lived experiences, and they assume that the ACs that are taught through schooling are correctly, and immediately, appropriated by students.

Path b on the left side of Figure 1 represents an iterative loop of formative assessment that results from the get it or don't conception. Formative assessment is used only as it pertains to whether the students get it or they don't. This content-centered assessment fails to provide opportunities for students to make use of their EBCs in ways that can mediate the development of ACs. Instead, it represents a traditional mode of instruction where students are presented with academic ideas devoid of opportunities to

coordinate them in meaningful ways associated with their own lives. For students, this type of instruction often results in the memorization of terms, figures, and facts but has little to do with developing a conceptual understanding.

The EBC of Prior Knowledge and Formative Assessment

In contrast to the get it or don't conception, some preservice teachers articulated an EBC conception of student prior knowledge. In these cases, preservice teachers defined student prior knowledge only as students' EBCs, with little attention to how this knowledge related to the target objectives of a lesson or unit. This process is shown by the thought clouds extending from the box representing EBCs on the right side of Figure 1. Path c represents the formative assessment process by which preservice teachers recognized, described, and analyzed the valuable EBCs that students had and went on to provide contexts that would allow students to continue to use their EBCs, but without regard to academic objectives. An example of this is a preservice teacher whose goal was to teach fourth-grade students the concept of density. Her preassessment data analysis yielded a limited number of student ideas about sinking and floating: heavy things sink, light things float, things with holes float, and metal things sink. She went on to allow students to test these ideas by dropping a variety of objects in a basin of water. After students were finished experimenting, the teacher asked, "What did you learn?" Students said such things as, "a paper clip can sink or float," "some things will sink if you push them harder," and "the sponge sinks when it gets filled with water." The teacher then concluded the lesson, reporting that it was a success and that she would not change anything. Although this was a useful activity, it did not address her original objective and it failed to provide a framework for students to organize their existing knowledge, establish formal language and practices of a community, and abstract their EBCs so that they were usable in a broader array of possibilities.⁷

The Mixed Conception of Student Prior Knowledge and Formative Assessment

Path d, near the bottom of Figure 1, represents a different EBC conception whereby preservice teachers elicited students' EBCs, recognized and described them, and went on to teach a lesson that had little or nothing to do with the EBCs they had recognized. In these cases, preservice teachers recognized and described students' EBCs, but because students' articulations of the topic did not consist of the complete AC, as was the case with Daniel, they concluded that students knew nothing about the topic and reverted to the get it or don't view when actually engaging in or planning instruction. Cases in which preservice teachers recognized and described students' EBCs were not always followed by the get it or don't conception. In some cases, preservice teachers described and seemed to value students' EBCs but did not do anything with them. In these cases, preservice teachers went on with their lessons, having little or nothing to do with the valuable prior knowledge they recognized.

THE UTILITY OF A THEORY-ENHANCED MODEL OF FORMATIVE ASSESSMENT

Preservice teachers entered my course with their own prior knowledge, consisting of language and concepts they have appropriated from their other teacher preparation courses, their experiences in teaching settings, and from their experiences of many years as students in formal learning environments. Apprenticeship of observation (Lortie, 1975) is the process by which learners appropriate an understanding of teaching and learning based on their experiences as a learner. It is likely that the preservice teachers who participated in the classroom research described above have experienced many courses where teachers rewarded them for "getting" the formal concept and took off points for "not getting it." The get it or don't conception is prevalent in our schools and universities. Most teachers or teacher educators have at least once said, "They just don't get it!" It is less common to hear teachers ask "What do they get?" It should not be surprising, then, that

preservice teachers frequently appropriated the concept of student prior knowledge and formative assessment through the lens of the get it or don't concept. A Vygotskian explanation of this phenomenon is that the preservice teachers viewed the notion of student prior knowledge through the lens of their own classroom experiences. At the same time, they used the academic terminology *prior knowledge* in their current experiences in elementary classrooms before they fully understood it. Comments such as "After I gave students their prior knowledge, I continued with the lesson" appeared near the end of the semester in early implementations of this course. Such comments do not represent a complete failure to teach the preservice teacher the concept of prior knowledge but instead, the process of learning it, which often takes the form of a hybrid concept. Knowledge of what preservice teachers do understand at given points in time can help teacher educators design lessons and curricula that provide opportunities for preservice teachers to try out their evolving knowledge.

DISCUSSION

Preparing teachers is not a matter of determining whether our preservice teachers get it or they don't. Instead, it is a project of finding out what they do know at various points in time throughout their teacher education so we can use this knowledge to inform our own methods for preparing teachers for further learning. Preservice teachers should be made aware of common conceptions such as the get it or don't conception of formative assessment. Teachers and teacher educators who can recognize their own knowledge as knowledge-in-information are in a better position to recognize the value of the knowledge of others, especially if it is not fully consistent with their own. Recognizing our own knowledge as knowledge-in-information helps us reposition ourselves from identities of "teachers as knowers" who provide information for our students to identities of "teachers as learners" who collect, interpret, and use information provided by our students.

A theory-enhanced model of formative assessment can provide a schema for beginning

teachers' reflections and further learning in school contexts. Teachers, like any learners, learn by using formal concepts in relevant contexts that foster the generation of personalized, conceptual understandings that are consistent with not only their own evolving conceptions and practices but also the larger community in which they work. Practice using formal concepts as a means for further developing them is a necessary exercise for anyone teaching in new school contexts. Schools may or may not be closely aligned with beginning teachers' beliefs or with the philosophies and methods of their teacher education programs. The implication of this is that preservice teachers must leave their teacher preparation programs with tools with which to manage this tension. The theory-enhanced model of formative assessment frames the notion of "inquiry-based teaching," where a teacher engages in the process of inquiry by collecting data on student prior knowledge with respect to a goal, adjusting instruction as a result, and performing a teaching experiment intended to bridge students' prior knowledge with academic or intermediate objectives. Inquiry-based teaching not only positions the teacher as a learner but also provides a framework for collecting and analyzing data relevant for supporting arguments (to oneself and others) regarding appropriate necessary next steps in one's own classroom. Based on the notion of valuing and respecting students' knowledge, the theory-enhanced model of formative assessment can help teachers move beyond the get it or don't conception of student prior knowledge and formative assessment.

NOTES

1. The term *student* is used throughout this article in reference to K-12 students only.

2. Daniel used the Web site <http://tycho.usno.navy.mil/vphase.html>.

3. The theory-practice dichotomy in teacher education was problematized by Smagorinsky, Cook, and Johnson (2003) in an article that provides an interesting discussion of the need for the integration of theory and practice.

4. Experience-based concepts (EBCs) are typically thought of as concepts that learners develop in everyday, nonformal learning environments. However, experiences as learners in the school setting might also serve as EBCs about teaching and learning for preservice teachers.

5. I refer to a student's prior knowledge with respect to an academic concept (AC) as a student's "conceptual understanding." This could be misleading because educators often use the term *conceptual understanding* to refer to an understanding of a concept that is closely aligned with an AC. To avoid confusion, I use the term *hybrid concepts* to refer to those ideas that are a combination of a student's EBCs and ACs and are not fully aligned with a particular AC to which they relate.

6. Others have used the terms *complex* and *pseudoconcept* to refer to what I am calling *hybrid concepts*. I avoid using Vygotsky's (1986) terms *complex* and *pseudoconcept* because in my understanding of his work, complexes and pseudoconcepts are more a property of EBCs (spontaneous concepts) than they are a property of mediated academic knowledge.

7. These types of lessons are also very useful for students' development of concepts such as observing, describing, classifying, and experimenting. However, in this case, these were not the goals of the preservice teacher's lesson.

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