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The Problems of Practice: Bricolage as a Metaphor for Teachers' Work and Learning

In this article the author uses Levi-Strauss' (1966) metaphor of Bricolage to examine how teachers, not policymakers, make sense of their "problems of practice" in three United States high schools. The article also examines how teachers address these problems of practice. It concludes by underscoring the disconnect between teachers' and policymakers' perspectives on the challenges to teacher practice in the US. Finally, implications for practice and research are drawn.

L'auteur de cet article s'appuie sur la métaphore du bricolage de Lévi-Strauss pour étudier la façon dont les enseignants, et non les décideurs, trouvent un sens aux problèmes liés à l'exercice de leur profession, et comment ils y font face. L'étude porte sur des enseignants dans trois écoles secondaires aux États-Unis. La conclusion de l'auteur révèle la discordance entre la perspective des enseignants et celle des directeurs sur les défis du milieu de l'enseignement aux États-Unis. L'auteur présente également des incidences de sa recherche sur la pratique et la recherche.

The *how* and *what* of teachers' learning has been debated in policymaker and practitioner circles for at least the past decade. Scholars have argued that teachers' learning should focus on closing the gap between teachers' know-ledge and students' performance goals (Hawley & Valli, 1999); strengthening teachers' understanding of the connections between content and students' thinking (Thompson & Zeuli, 1999), and creating a tighter organizational fit between teachers' learning activities and teachers' work (Little, 1999). Others have argued for the importance of understanding the relationship between the nature of teachers' work and teachers' learning (Grant & Sleeter, 1987; Scribner, 1999). Inherent in the scholarship on teaching—and more specifically teachers' learning—is the tension between teachers-as-craftspeople and teachers-as-technicians (Huberman, 1993). Whether perceived or real, debates about teaching as craft or science are alive and well across the international landscape. Current trends at the state and federal levels in the United States suggest that those who judge teachers and their work increasingly view teaching as a scientific—that is, technical—endeavor. Defining the problems of practice for teachers has become a centerpiece of the current *No Child Left Behind* legislation such as gaps in achievement among students in reading and math, and lack of adequate teachers' content knowledge (US Department of Education, 2002).

The purpose of this study is to explore the nature of teachers' learning in the broader context of increasing accountability from the state level. Levi-Strauss' (1966) concept of *bricolage* has been used to study the nature of work generally

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(Harper, 1987; Weick, 2001) and teachers' work in particular (Hatton, 1989; Huberman, 1993; Scribner, 2003, Tarter, 2003). Specifically, in this article I make use of Levi-Strauss' bricolage metaphor to explore teachers' workplace learning and explore the teachers-as-bricoleur/engineer dichotomy. The application of this metaphor to a dataset of US high school teachers is timely, as the craftsperson-technician debate, although not explicitly stated, is common in much of the formal discussions on teachers' work and education in the US, with the federal stance arguing for teaching as a technical endeavor. In this context and based on the assumption that "problems of practice" are a catalyst for learning, the following research questions were addressed:

1. How do teachers define "problems of practice" in their work?
2. How do teachers go about solving these problems of practice (e.g., what resources and strategies are employed and how)?

The discussion section addresses the question: Given how teachers perceive and address problems of practice, what implications for policies and practices for teachers' learning should be considered in the context of increased emphasis on teachers' quality and measurable student outcomes?

Theoretical Framework

Teachers' learning is a complex activity and difficult phenomenon to isolate and study. Some have evaluated professional development programs as a way to examine teachers' learning; others have examined on-the-job learning; and still others have speculated on the roles various organizations (districts and schools) and educational leaders (superintendent and principals) play in the teachers' learning process. The present study emerges from a research program that has been exploring the relationship between the context of teachers' work and teachers' learning.

Scribner (1999, 2003) has asserted that teachers' work influences in important ways how teachers learn. The "hot action" of teachers' work compels teachers to focus on and favor certain learning activities to the exclusion (or at least tolerance) of others. In fact the nature of teachers' work across rural, urban, and suburban contexts seems to force teachers to rely primarily on learning from individual and isolated experience and infrequent interactions with select colleagues—even in schools claiming to be professional learning communities. In fact creating workplace communities where teachers truly feel free to open themselves up to critique by other professionals has been intermittent and dubious at best (Scribner, Hager, & Madrone, 2002). In spite of these challenges to learning, teachers do learn, their students learn, and challenges of practice are often resolved, leading to improved learning environments, at least in the confines of the classroom.

Research suggests that teachers' learning on the job is significantly influenced by teachers' work context defined by a tripartite relationship between teacher, student, and subject matter (Scribner, 2003). In short, students and subject matter serve as catalysts for teachers' learning. The question remains, however: How do teachers respond to these catalyst(s)? It is with this question that we turn our attention to the *bricolage* metaphor. But first a caveat. The uses of metaphors and analogies are common practice in research, especially qualitative research (Beck & Murphy, 1993). However, the purpose here is not to reify a metaphor in these data or vice versa. Rather, the purpose is to use

bricolage as a heuristic device to illuminate how teachers approach problems of practice (Hatton, 1989). As other studies have done (Hatton; Huberman, 1993; Parker & McDaniel, 1992), this study uses bricolage as a conceptual organizer in an effort to contribute to conversations of teachers' work and make explicit certain assumptions inherent in many of those conversations. What this study does that others have not is to apply bricolage as a heuristic device to understand how teachers define and address problems of practice.

To use bricolage effectively as a device, it must first be understood for what it is and what it is not. Levi-Strauss (1966) introduced the concept of bricolage as the art of creating with what is at hand. The bricoleur is a do-it-yourselfer who does not look for (or does not have available) new tools to address a project, but rather uses what he or she already has available. Thus the bricoleur practices a "combinatorial art" (Levi-Strauss), continually arranging and rearranging available materials and resources. The bricoleur's "tools" are acquired not with some use in mind, but with the hope that one day *they will be useful*. The bricoleur's means are the direct result of past experience, and those means are heterogeneous and finite. The bricoleur's means are heterogeneous because each element (i.e., tool) has a variety of uses, and they are finite because he or she does not, except serendipitously, add to his or her "tool kit." In other words, the bricoleur's response to the task at hand is limited to a rearrangement of the existing means (Hatton, 1989).

Levi-Strauss (1966) contrasts the bricoleur with the engineer. As opposed to working with images and understandings that are linked to past experience, engineers work with concepts that are transparent to reality (Wiseman & Groves, 2000). The engineer is concerned with concepts, working from plans and anxious to get the structure right (Caws, 1970). That is, the engineer is "always trying to make his way out of and go beyond the constraints imposed by a particular state of civilization while the 'bricoleur' by inclination or necessity always remains within them" (Levi-Strauss, p. 19). Mercel (1998) distinguishes the engineer as a professional who is project-driven. As such the engineer seeks the systematic transformation of his or her surroundings based on rigorous methods that are grounded in theoretical knowledge. Furthermore, the elements the engineer uses are generally specific, predictable, and available in the necessary form (i.e., they are in their intended state).

Whereas the bricoleur works with what is immediately available and acquires new knowledge by happenstance, Levi-Strauss (1966) theorizes that the engineer is on a quest to develop new tools (e.g., concepts and theories) to solve problems. However, the bricoleur "does not have a framework of a coherent project" (Mercel, 1998, p. 145). As Mercel states, "for the bricoleurs it is always a question of an occasional, limited intervention" (p. 149). In addition, the bricoleur's work does not require a specific (i.e., professional) knowledge, and the materials used are not specific, as the bricoleur reuses and modifies the use of the materials he finds, which were often meant for purposes other than their ultimate use. Finally, the results of the bricoleur's work are uncertain, never identical, and thus difficult to reproduce. As Caws (1970) puts it, "the bricoleur is a handyman, the tinkerer, who gets surprising practical results from the most unlikely material" (p. 202).

Put another way, the bricoleur practices the "art of the concrete" (Harper, 1987, p. 74); the bricoleur takes a "pragmatic orientation" (Hammersly, 2004).

As such, Hatton (1989) makes the case for teachers' work as bricolage. She describes teachers' work as inherently conservative in that teachers rely heavily on survival strategies to routinize work. Teachers' work, although creative, has its creativity limited by environmental constraints such as lack of resources to bring to bear on problems. She argues that teachers rely on professional repertoires (i.e., bags of tricks) that mimic the experiential learning approaches of artists and craftspersons. She also argues that many teachers' use of theory to undergird their practice is limited and often reliant on simplistic theories such as "unsophisticated deficit models" (p. 80). Finally, Hatton claims that the ad hocism that so defines teachers' work parallels what bricoleurs do. As she puts it, "Teacher work, understood as bricolage, involves the adoption of ad hoc (coping, survival, dilemma management) strategies. The strategies are formulated by practitioners who have gained their knowledge of teaching through experience with these existing constraints" (p. 84).

Although Hatton (1989) makes a convincing—albeit somewhat negative—case that teachers are bricoleurs, two things are apparent. First, the science of the abstract practiced by Levi-Strauss' engineers can be seen in the work of teachers. Teachers, the argument can be made, have been known to use more sophisticated theories of learning, multiculturalism, and others to guide their practice (Parker & McDaniel, 1992). And second, as Weick (2001) and others (Harper, 1987) have argued, the attributes of bricolage are not necessarily negative. Applying the metaphor to organizations, Weick argued that bricoleurs have an advantage over engineers because whereas engineers take on only those projects for which they have the necessary raw materials and resources, bricoleurs learn to operate in the environment that they are given. And in that situation they are limited only by their creativity. Harper argued that the bricoleur's creativity stemmed from continual considering and reconsidering, "always with a view to *what is available*, what is at hand" (p. 74, emphasis in original). Thus the question to be explored here is how the characteristics of teachers' work favor one way of knowing versus another when it comes to solving problems of practice. For problems of practice are the wellspring of teachers' learning.

Methods

Thus to explore and understand how teachers defined and addressed problems of practice, and to explore the implications of the findings for policy and practice, this study relies on two sources of qualitative data. In-depth teacher interviews and focus groups constitute primary sources of data. Observations of teachers at work constitute a secondary data source. Although data from observations are included below, the primary use of observation data was to inform the types of questions about problems of practice and teachers' work asked during interviews and focus groups.

Data collection and analysis was carried out over two academic years and involved several stages. First, three high schools in a mid-sized, midwestern, US city (population 90,000) in the same school district (student population 16,850) were identified and access was obtained. For this district, like many in the state, public scrutiny has been on the rise, focusing close attention on persistent and dramatic achievement gaps between White and most non-White student groupings, high dropout rates, and overall all school-level perfor-

mance on the state assessment. High schools from the same district were selected to achieve a variety of school contexts, but to also maintain broader organizational consistency. Two of the high schools were large comprehensive high schools (student populations of 3,000 and 1,700). The third was an alternative school with approximately 250 students in which students were engaged in nontraditional learning environments (i.e., at off-campus locations) as well as traditional academic instruction on the school grounds.

Second, using in-depth interviews, data were collected from 26 teachers (from core academic subject areas; 10 each from the larger high schools and six from the alternative high school). Teachers were purposively selected for representation across content areas, years of teaching experience, and sex. Teachers from core academic areas were selected because these are the subjects tested in the state's accountability program. Teacher interviews focused on teachers' perceptions of their work environments and their learning and problem-solving strategies. Also, school administrators at each school were interviewed to gain an additional perspective on teachers' learning opportunities and the school's philosophy toward teachers' learning. Interviews lasted from 45 minutes to two hours. Third, observations of teachers at work and in team meetings were also conducted. In each school two of the interviewed teachers were shadowed for three days each; impromptu interviews were conducted with these teachers throughout shadowing to explore their thinking. Finally, informed by individual interviews and observations, one focus group interview with previously interviewed teachers was conducted at each school to explore emerging propositions further.

Consistent with the study's exploratory orientation, data were analyzed using methods of grounded theory. Analysis began early in data collection to ensure that interview protocols and the focus of observations were true to themes emergent in the data. Well-documented analytical methods were used (Strauss & Corbin, 1998) to analyze interview transcripts and observation notes including open, axial, and selective coding. To increase the trustworthiness of the data, two teachers were selected from each school to review final analytic memos before the final writing stage. In some cases minor changes to interpretations were made, but by and large the conceptual categories developed rang true with the teachers.

The design and philosophical approaches undergirding this study do not lend themselves to generalizing to larger populations of schools or teachers. However, a strength of research projects that fall within the qualitative traditions is the ability to question taken-for-granted meanings or conventional understandings—like problems of practice—and uncover the tensions and paradoxes inherent in them (McLeod, 2001). Another limitation is the focus on only academic teachers. Following the logic of grounded theory methodology, future research may broaden the scope to teachers to include non-core academic teachers such as fine arts or vocational arts teachers. However, given the intense scrutiny from external sources on school and students' performance in academic subjects, this study starts with these subjects.

Problems of Practice: Their Context and Definition

The problems of practice as teachers define them are closely linked to their work contexts. Juxtaposed with the current climate of accountability in the US

and the pressures placed on districts and schools through punitive measures, teachers continue to define their challenges and rewards at the local level. The relationship between teachers' work context and the challenges teachers faced was evident at each school. As the context of each school varied, so too did the problems that manifested themselves to teachers. However, these problems differed in degree more than in type. Challenges emerged in teachers' practice in a context that was bounded by teachers' relationships with students and their content knowledge (Scribner, 2003). Thus the relationship between teachers and students was the defining characteristic of teachers' work context and this contributed to the perception of teachers as bricoleurs. By being so firmly situated in their primary work context, teachers solved problems individually and locally with little opportunity to distance themselves from the challenges they faced. Therefore, the learning strategies chosen tended toward tried-and-true strategies, rather than more reflective, deprivatized (Seashore, Kruse, & Marks, 1996) approaches that actually expand one's tool kit. In the sections that follow I show how given the nature of teachers' work, teachers' problem-solving lent itself to bricolage. I also show how in certain circumstances teachers showed evidence of approaching problems as might Levi-Strauss' engineer. The point here is not to privilege one type of problem solving activity over another, but to employ the metaphor of bricolage in a way that helps us to see the differences and figure out its implications for teachers' learning.

The schools exhibited their own unique contexts in spite of the common strands of organizational culture that ran through the district. I found that although common elements of the notion of problems of practice remained constant across school contexts, the differences among schools (e.g., organizational culture, organizational mission, student body, etc.) shaped how and what teachers perceived their problems of practice to be. Commonalities across schools were twofold. First, the nature of the teacher-student relationship in the education process presented opportunities and challenges to teachers. Second, although it may sound oxymoronic, a common contextual feature within and between schools is difference and unpredictability. Although the general school culture sets a tone in any school, teacher-student and teacher-group relationships change daily (or even more frequently). Thus even in the same school teachers' problems of practice vary among their peers on multiple dimensions.

Although other studies that explore the context of teachers' work have developed broader descriptions of context, the focus on problems and problem-solving in this study led to a much narrower definition. In this regard, the teacher-student relationship is *the* defining characteristic of context. In particular, data showed that two aspects of this relationship shaped teachers' work context: (a) the challenge of engaging students with the content regardless of students' interests, background, and so forth; and (b) balancing student engagement and student control (i.e., classroom management).

The Work of Engaging Students
Perhaps surprisingly, these high school teachers were primarily concerned not with delivering content, but with connecting with their students. Several teachers described this approach to their work as a continuing journey, one that

began "teaching stuff to students" but that had evolved into "teaching students stuff."

> I got into teaching thinking—probably like most people have been conditioned to by their experience as a learner—that teachers teach stuff to students. And I have learned that really it's teachers teaching students stuff. We don't really get trained very much as high school teachers on how to teach students; we get trained on how to teach stuff. And that's a terrible problem.
>
> I: So what does it mean to you to teach students?
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> It means that you cannot start any instructional session or even any planning for an instructional session predicated just on the content that the class is supposed to be about. It has to start out a little bit with that, and you have to know enough about that to be able to make good decisions about what's worthwhile as a context for learning from the content that you're supposed to be using. Then you have to see who your clientele is and what you're supposed to accomplish with those students. Because the content is going nowhere. It's only the students that are going somewhere if you can help them with that.

The above comment represents what several teachers in this study said about the critical challenge of connecting with students. The comments by the English teacher below further support this relationship as she describes how students are the focal point and her challenge is to develop strategies and approaches to engage her students with the content.

> Well, probably, there's more of an emphasis on pedagogy, as far as my own learning, and that is how to deliver that same old thing-and really it's the same old thing that I tried to deliver long ago. It's still reading, and it's still thinking, and it's still writing. It's all those things, and in some cases, it's some of the same works, but I think it's how we deal with delivering that to contemporary students. And I'm not one who thinks students have changed all that much, although I do think there is a difference in students now than when I began. But I think that our emphasis is on different things and strategies and discussing things, and there's a huge emphasis on group work, for example. And I'm interested in those sorts of things, on how we can get more out of our students, how we can communicate better with our students. I think there's more of an emphasis on the student as an individual than there was.

Another thematic difference between teachers at the two comprehensive high schools and the alternative high schools was the degree to which the alternative high school teachers described their role as impromptu counselors or social workers as a result of the challenges they and their students faced. In this regard, an English teacher from the alternative high school remarked that in addition to the challenge of knowing exactly what to do for each student, it is equally difficult to know if the strategies employed actually worked in any meaningful way. She noted,

> I *know* my students; I make the effort. You're not always successful. Sometimes it comes back a year or two later. The kid that was a little butthead and you can't work it out you have this personality thing and then they come back and they're your star student, or they come and visit you for years after they graduate when there was a point you never wanted to see them again.

A teacher at the alternative high school believed that teachers at the school had a handle on content knowledge, the organizational demands of running a school, but were often challenged to meet students' nonacademic needs:

> I think that we do a really good job of [teaching and running this school]. Our teachers work together to put together interdisciplinary units to talk about things that are of concern to them whether it be subject matter or discipline and behavior, so I don't really see that as a problem in their major content areas. I think they have the knowledge they need. Now as far as going into those areas of drug and alcohol abuse, dealing with the disruptive students, the gang related things, I think we need help there. And helping students with their careers.

Thus unlike the unrelenting din of conversation surrounding achievement, test scores, and accountability in the US, these teachers were in a continual state of learning to address the social, as well as the cognitive, learning needs of students. Observations of teachers at work and in discussions during team meetings and even during breaks reinforced the points made above. At each school teachers stressed that they were teaching children, not subjects. However, at the alternative high school, context shaped teachers into seeing themselves equally focused on social and academic issues. As one teacher put it, "I tend to see myself as a traffic cop and these kids are going through a real dangerous intersection [in their lives]."

Thus teachers view problems of practice embedded in a complex, multifaceted and multilayered work context: much more complex, multifaceted, and multilayered than external critique, policymakers, and other interested parties see. By acknowledging the diversity of learners in their charge, teachers complicate the context of teachers' work and thus increase the demand on knowledge and skills teachers need to connect with and nurture the development of myriad students.

Balancing Students' Engagement and Control
The second defining feature of this teacher-student relationship was addressing the challenges posed by classroom management. These teachers experienced a continual balancing act as they tried to empower their students to learn and make choices on one hand, while maintaining classroom control and meeting more narrowly defined academic learning goals on the other. Teachers at all three schools discussed the problem that maintaining classroom discipline posed to them, especially in the light of their efforts to connect with students. For most of the teachers, classroom management was a challenge as a result of the broad diversity of learners. One teacher described the importance of first connecting with students in order to manage students in the classroom: "I have a pretty firm basis as far as discipline issues. If a student doesn't feel connected with something, basically me, it's really difficult to go on with anything in the classroom that's meaningful."

A social studies teacher at another high school described the divisiveness of the students' engagement and control conversation took among the faculty as a whole.

> Well, it's complicated, so I don't know if I can explain it, but it's not sensitive. The whole business about tardies. Every year that I've been here we have this fairly lax—in the eyes of some people—there have been those who teach here

that are just driving everybody else nuts about kids being in class on time. And for years, that used to come up in summer staff retreats. And finally we stopped having retreats, because a lot of us stopped going because we didn't want to listen to certain people bitch about tardies or about cutting kids' hands off, figuratively speaking, for this infraction or that infraction.… So we have a lot of pressure to create more rules about tardies. And so this year, for the first time since I've been here, we initiated and we adopted it last spring, a policy where basically you're going to get the loss of your unassigned time. That that's going to be deprived from you on a sliding scale for disciplinary infractions about truancy or about tardies or whatever, that you're going to lose your unassigned time, either for a certain number of days or maybe for the entire school year if it's a repetitive infraction. And that there's no negotiation here. If it happens, we cut your hand off one knuckle at a time. And that is very different than the policy that we've had before.

The context of the alternative high school revealed some additional challenges facing these teachers. If fact engaging students and keeping them in school in any possible way was paramount at this school. As a math teacher new to the school stated,

Classroom management was the first obvious challenge that just blew me away in the beginning. And it still is.… It's so different here than my student teaching experience. Nothing is the same here; everything I learned in college was completely out the window when I came here. The rules just didn't apply. So basically, I've had to learn everything all over again and completely change it to this particular school because it is so incredibly alternative.

He continued to describe the school's climate vis à vis classroom management and discipline.

Even classroom management is completely alternative here. [Students] allowed to walk around whenever they need to. If they need to leave class because they're gonna blow up, they're welcome to do that. They have smoke breaks, the whole nine yards. So I just had to watch other teachers. The traditional approach to classroom management's just not gonna fly. No. In fact that has the negative effect, the opposite.

Finally, during one observation event at one of the comprehensive high schools, one teacher team was observed struggling to address the needs of a certain group of children they saw as in danger of becoming at risk. The problem as they defined it was how to assist a segment of their student population from falling behind academically. This situation was of interest because these teachers acted proactively to identify a problem and address it before their students slipped further into an at-risk classification.

As these comments show, teachers were in a continual process of balancing and negotiating how classroom control (i.e., power) played out. In other words, a main feature of context is the continual negotiation process that goes on between teachers and their students. To engage students teachers had to negotiate, not dictate, the intellectual and social space in which they would work together. With this in mind I now turn to problems of practice embedded in the context described above.

Defining Problems of Practice

Bricoleurs and engineers do not necessarily address different problems, but they do address problems differently, according to Levi-Strauss. As data from these teachers suggested, challenges to practice presented themselves in many ways. Problems of practice were often vexing in that their cause was uncertain and the solution less uncertain. From day to day and month to month, solutions to similar situations might or might not work. Yet generally speaking, problems flowed out of the contextual characteristics described above. The range and nature of challenges to teachers' practice shaped how teachers described and addressed these challenges.

Thus although teachers knew that their primary challenge was to engage students and maintain some level of guided learning and control, the context—primarily manifested in the relationships between teachers and students—was continually changing, making it difficult to address challenges that arose in any systematic way. The fluidity of this context is unlike most situations facing engineers where situations are typically better defined, more predictable, and relatively constant. Given this context it is clear why conceptual framing and theorizing take a back seat to situated problem-solving with whatever knowledge and skills are at hand: whether the knowledge and skills reside in one person or group. As one teacher described, the challenges change with each group of students, even each student, on any given day.

> And that's a different story every class period with every group of learners if you want to create a community of learners of which you are a part … and nobody knows exactly what that looks like on any given day. So there's a lot of ambiguity there, and you have to have a real repertoire of sensitivities and skills as well as content knowledge to be able to react appropriately and make use of what's put on the table for you in terms of the kids and where you are.

In this study, how teachers defined the problems illustrated a phenomenon grounded in a social and working relationship between teachers and students. On one level, the problem is simple: to achieve and maintain a dyadic and group-based relationship that allows children to learn and teachers to guide that learning. On other levels the problem is vexing. How do teachers achieve and maintain the connection they seek with students when the context is in a constant state of flux? And how can they achieve these relationships when the definition of teaching and learning is increasingly being imposed on educators and students from the outside?

The challenge of maintaining learning environments in the classroom was a pervasive topic of conversation among teachers at the alternative high school. Data from this school was rife with immediate challenges to teachers' sense of efficacy, that is, their ability to help students learn. Teachers also described the challenge of how to maintain students' engagement with such a wide range of students' ability levels present in any one class. Not that teachers were unsuccessful, but the problems of achieving and maintaining students' engagement with the material and addressing a broad diversity of learning abilities placed teachers' problem-solving in a fairly continual state of decision-making in the hot action of teachers' work. However, the extent to which teachers described the challenges of engaging students or managing the classroom differed by school. Time spent observing teachers individually and in groups suggested

that the comprehensive high school teachers spent more time discussing their efforts to find ways of engaging all students, whereas the emphasis of data collected from alternative high school teachers focused more on classroom management challenges. For example, the flavor of many of the conversations with teachers (especially after observations) was discussing how to motivate students who "were at their last stop" in public schools. During one focus group, a teacher from the alternative high school stated:

> If they don't like the teacher, I don't care what the heck the method is, they're gonna have a harder time responding, especially our kids. Now a teacher with a bland personality but with a great method I'm sure with advanced kids, that's fine, they learn in spite of the teacher.… They have different motivators. But kids like ours that have motivational problems, you have to find different ways to motivate them and it's not always pedagogy, it's personality and you hope that you mix the two.

Another teacher from one of the comprehensive high schools described the motivation challenge this way.

> Well, again, with the different levels of students that you deal with, I think that has a lot to do with it. With one level of students, you are constantly having to improve yourself just with the knowledge base, so you can challenge that student more. On the other end of that spectrum, the techniques that are going to be necessary to motivate a student that is not highly motivated or that has a different learning style is certainly … well, how do you? You have two different approaches that you do there.

Learning Strategies

The fact that difference, unpredictability, and change abound in schools is certain to draw a collective yawn from most educators. However, it is important to note that the extent to which teachers had the skills and knowledge to confront challenges determined (a) how they saw and interpreted their context, and (b) the strategies chosen for problem-solving. In short, as a phenomenon, problems of practice are defined *by*, not *for* teachers. And how problems of practice are defined is contingent on each teacher's knowledge and skill set and his or her unique context.

Combined with our understanding of how these teachers perceived challenges to professional practice, how they addressed these challenges suggests that in many ways they did address problems—most of the time—as bricoleurs. Data suggested that most challenges were dealt with in the moment, through reflection-in-action as opposed to reflection-on-action. Given that teachers and the challenges they faced were deeply embedded in the context of their work, the opportunity for reflection and the acquisition of new tools or knowledge to address the challenge was not realistic. But data also showed that given these constraints, teachers were multifaceted learners and problem-solvers, often drawing from multiple learning experiences (both recent and in the distant past) to resolve these challenges.

As explained above, challenges to teachers' practice presented themselves in relation to their students and the content to be learned. Of particular note, teachers *did not* describe the phenomenon of interest in terms of challenges with colleagues, principals, or parents. Teachers described the act of their own learning as something that took place on a need-to-know basis, focusing on

pedagogy, content, students, and their culture, and ways of connecting the three. In dealing with acute and chronic challenges, teachers sought to learn in direct response to challenges. Thus the learning typically was informal, localized, and reactive.

This approach to learning caused teachers to rely on certain learning strategies to the exclusion of others. In addition, the time sensitivity of most challenges caused teachers to seek the quickest and most accessible learning strategies: in other words, to act as bricoleurs who must solve problems using what is at hand. They used a variety of sources to inform their teaching and address challenges they faced. In response to immediate and chronic problems, teachers in this study—especially more novice teachers—described the use of an informal apprenticeship model in which they observed colleagues. Often this type of observation was passive, with little formal communication and reflection between teachers. Teachers described the application of knowledge gained through trial and error as a more common problem-solving approach.

Some teachers also experienced active learning through sharing with colleagues. In one school in particular, several of the participating teachers were observed working in content-area teams where information about acute challenges was shared on a regular basis and strategies for problem resolution were shared. In spite of team structures at other schools, less time was spent in these meetings and less specific, student-focused information appeared to be shared. Another problem-solving strategy was to rely on past experience as a guide to how to address present situations. The primary way that teachers addressed challenges to their practice was through informal learning. Much of this learning took place alone, through passive observation, and through informal (often chance) interactions with colleagues. Occasionally teachers described formal learning settings and activities as a useful means for addressing challenges to their practice.

In response to anticipated challenges, teachers were observed engaging in much more methodical knowledge-building activities for more general purposes. In a sense they warehoused information, again focusing primarily on issues related to pedagogy, content, and students in general. The knowledge, skills, and information were gathered in order to improve their ability to address unforeseen challenges and to understand better their context defined primarily through teacher-student relationships. This approach to problem-solving—strengthening one's capacity to address unforeseen problems—focused on the accumulation of both procedural (i.e., *how to*) and declarative (i.e., *theoretical*) knowledge.

Although teachers described mostly bricoleur-like approaches to learning and problem-solving, they did engage in activities that assisted in theoretically framing the challenges they faced. For example, in contrast to their own assumptions that they preferred practical knowledge to declarative knowledge, teachers spent a considerable amount of time reading theory and research on issues related to pedagogy as it related to teaching specific content and classroom management. For example, many teachers described reading in areas directly related to content and to some extent pedagogy. Several, especially social studies and teachers of literature, spent their time building their knowledge base through reading literature, leading newspapers, and academic journals. In this realm of knowledge and skill-building, teachers tended to speak of

their learning in more reflective terms. The following comment exemplifies this idea. This teacher showed herself a bricoleur in action as she described how she read the *New Yorker* on the chance she might find something applicable to her teaching. As she stated, she "read[s] things that don't have very much to do with my teaching … because you never really know when there's going to be some relation to that":

> Well, partly, just by keeping up with things. And I read the *New Yorker* largely because it's an example of discipline. It's deep writing. The topic is in depth, and it's what I want my students to strive for. And I'll bring those to school when I'm finished with them, and they like to read those. And I just like to have them be exposed to that sort of magazine. Newspapers, mostly just keeping up on what's going on. And I have used the editorial pages many times for examples of persuasive writing or not, opinionated pieces, the viewpoint pieces and that sort of thing. We discuss that particularly in the composition class.

Teachers described a careful splicing and pruning of knowledge from various sources as knowledge that needed to be revised and corrected. They often described reading out of their field and reading primary sources of "giants" in their disciplines. As one teacher explained, he did this in order to meet the needs of his students as they too struggled with the content.

Whether learning was focused on an immediate challenge or a chronic problem, teachers described a process that relied on multiple sources to build knowledge and skills. The sources varied depending on individual teachers' context and experience and the resources available at any given moment. In short, the learning was often serendipitous and opportunistic. For example, this teacher described how she and her colleagues made use of elements of past reform efforts.

> Here in an alternative setting, we tried it all, we tried outcome based, we tried a lot of that type of thing. We tried outcome based, our school went to outcome based, seven or eight years ago, we decided that wasn't the best thing for us. However, any good teacher uses a lot of the principles of outcome based just in their everyday or every unit teaching they should use outcome-based principles. So we didn't go as a wholehearted philosophy, though, but I think that we use a lot of the principles even now. However, I think we have a little more rational way of going about it.

The above comment suggested that teachers assimilate various strategies, melding together past experiences to address a current problem. Teachers are in a continual state of transforming knowledge to make that knowledge relevant to their context. They keep bits of things that work and discard what does not.

Another teacher described how she collected information and tools for teaching throughout her career, each step assessing, pruning, and splicing ideas as she found what worked best for her students.

> There are always some little short tidbits, I guess you'd say, or suggestions that I have picked up and used. One that comes to mind was an idea about portfolio assessment.… I use an alternative assessment. And there are all different kinds of ways to do that. I'm still working on how to configure that

particular kind of assessment for kids. And there have been some practical ideas on which things work best with that.

The teacher quoted below provides an example of the bricoleur-in-action. In this quote it is apparent that for this experienced teacher identifying the problem is not perplexing: it is the solution to the problem that leaves persistent doubt.

> It depends on where I'm seeing a problem. If I'm having problems with a student with discipline, and I see an article that's about discipline, then I would probably read that and try to apply some of it. If I'm worrying about how I'm teaching writing, if I'm doing the most effective job, then I start looking for articles about writing, and that's sort of what, that's where I am in my teaching, usually that dictates what I choose to read, and it's usually what I need to help my classroom be better.

In each of these examples teachers were engaged in a process of pruning and splicing knowledge and skills from various experiences (learning experiences, work experiences, etc.) to form a knowledge base to solve problems.

Conclusion

The purpose of this study was to explore how teachers understand problems of practice and how they address those problems. Clearly the immediate context in which teachers's work plays a significant mediating role in shaping how and what teachers view as the specific problem to be faced on any given day. In spite of nuances emerging from varying school and classroom contexts, teachers' explanations and observed experiences shed light on one important fact: teachers see the crux of the work as a human and dyadic relationship where the bounds of that relationship are guided (but not bounded) by content to be learned. Social and moral dimensions of the relationship were equally important. That is, teachers set goals for the students according to students' needs—students' needs as defined by teachers, not others. Often teachers' perceptions of students' needs focused on helping them mature and grow safely into adulthood or merely stay in school.

Noticeably absent from the data was the policy and school improvement rhetoric so prevalent in the US today. The national policy emphasis would suggest that teachers should be engineer-like in approaching their work. For example, in the US federal and state policymakers have joined in a chorus of externally defined problems of practice—for example, the achievement gap, high dropout rates, low parental involvement—accompanied by vague references to the need for research-based solutions when the research base is often inconclusive, or worse, contradictory. In this study, teachers rarely mentioned state or federal programs and policies geared toward increasing teacher and school accountability. Teachers tend not to see this external policy environment as immediately influential on them, on their context, or on the problems they are trying to solve. Also interesting, teachers in this study did not discuss their principals, schools, or colleagues as sources of problems of practice. Anyone who has studied schools for any length of time might expect data of the sort used here to lend itself to a theme related to school or leadership challenges. Instead, when asked to define problems of practice and describe how they address them, teachers focused squarely on the strength and quality of the teacher-student relationship. Teachers' problem-solving mode was

analogous to the bricoleur's. Teachers, like bricoleurs, found themselves in a rather insular spot. Thus teachers solved problems primarily by relying on recollections of past experience and local knowledge.

However, I would argue based on these data that teachers often act as bricoleurs by necessity. In fact the problems of practice so deeply embedded in daily classroom interactions require teachers to practice the "science of the concrete" (Harper, 1987; Wiseman & Groves, 2000). That is, teachers survived by "adapting the bricoles [i.e., odds and ends] of the world" (Harper, p. 74). Certainly local knowledge and skill developed through experience are valuable assets in any profession, but teachers also valued knowledge generated externally, even theoretical knowledge. But the nature of the work impeded access to these types of knowledge. Using the bricolage metaphor—especially the bricoleur versus engineer distinction—brings a new perspective to the teaching-as-craft-or-science debate as it pertains to how teachers define and address problems of practice. To continue with the bricolage metaphor, it should be clear that teachers are bricoleurs *and* engineers. The question becomes: How should organizations in which teachers work, professional associations, and professional development opportunities be used to bring various sources and types of knowledge and skill to address problems of practice?

As I mention at the outset, qualitative research traditions can cause us to pause and consider what is taken for granted. This study considered problems of practice, a notion that has become a cliché in today's discussions of teaching, learning, and schooling. The above findings and discussion suggested several implications for professional learning and development in the current context of accountability. Teachers and schools are being held accountable for the learning of all students. The potential power that lies in our willingness to press for achievement for all students must be accompanied by meaningful professional learning experiences for teachers. However, cafeteria-style menus of professional development opportunities persist in our schools. Arguably, this "buckshot" approach to teachers' learning persists and stems from a systemic entrenchment of professional development in the hands of those other than teachers. Outside consultants simplify the task of meeting continuing education requirements, and attempts to provide in-house professional development are stymied by an abundance of bureaucratic, not creative, thinking. The clarity of the problems of practice described here suggested a need for professional development opportunities that are defined by teachers. If the theory of external accountability inherent in such legislation as the US *No Child Left Behind* holds true, teachers will focus their learning on those issues that will lead to students' learning. In addition, however, teachers (and the schools and districts in which they work) should insist that professional development activities center around local knowledge and expertise, using outside experts and programs to assist in making connections, when appropriate, to the generalizable knowledge of the learning sciences.

Future research should continue to flesh out the properties and dimensions of various categories of problems of practice and the types of work environments that facilitate professional learning that specifically addresses these problems. As Skilton-Sylvester (2003) argued, schools, like organizations in other domains, must focus professional learning approaches so as to facilitate

the learning and problem-solving capacity of those enacting the mission of the organization.

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