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FORMATIVE ASSESSMENT, EQUITY AND OPPORTUNITY TO LEARN

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

In

EDUCATION

By

Soleste Hilberg

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Table of Contents

Table of Contents	iii
List of Figures	vii
Abstract	viii
Dedication and Acknowledgements	ix
Chapter 1 Introduction	1
Sociocultural Theory and Formative Assessment	2
Formative Assessment	12
Dual Roles of the Researcher	23
Chapter 2 Formative Assessment and Interaction Record (FAIR): Development, Inter-Rater Reliability, and Use	30
What is Formative Assessment?	31
Equity and Opportunity to Learn	32
Sociocultural Theory	33
Formative Assessment	35
Method	43
Participants	43
Measures	43
Procedures	46
Results	48

Discussion	51
Chapter 3 Using Formative Assessment in the Cycle of Inquiry: Principals as Leaders of Collaborative Dialogue and Reflection	57
Project Background	63
Method	66
Participants	66
Research Design and Procedures.....	68
Results	69
Principals’ use of FAIR data to increase teachers’ use of formative assessment practices.....	69
Discussion	87
Chapter 4 A Case Study of Teacher-Student Dialogue in the Context of Peer Assessment.....	91
Formative Assessment and Dialogic Instruction	91
Student Self and Peer Assessment.....	95
Sociocultural Theory and Dialogic Instruction	97
Method	102
Participants	102
Procedures	104
Lesson Description: Whole-Class Peer Assessment of Student Reading Logs.....	105
Measures and Variables.....	109
Results.....	114
Teacher Questions	114

Responsiveness	114
Initiations	115
Discussion.....	116
Student Participation.....	116
Discussion.....	118
Chapter 5: Conclusion.....	124
Formative Assessment from the Sociocultural Perspective	125
The FAIR as a Mediating Device for Collaboration and Dialogue Focused on Learning	127
Equity and Opportunity to Learn.....	131
Reflections and Considerations	133
Appendices.....	140
Appendix A: Presentation from Introductory Formative Assessment Professional Development.....	141
Appendix B: Teacher Assessment of the Value of Formative Assessment.....	143
Appendix C: Formative Assessment Professional Development on Questioning Strategies.....	144
Appendix D: Formative Assessment Professional Development on Feedback.....	150
Appendix E: Formative Assessment Professional Development on Writing Rubrics	152
Appendix F: Teacher Formative Assessment Self-Reflection.....	153
Appendix G: FAIR Walkthrough.....	154

Appendix H: District FAIR Walkthrough Snapshots 1, 2 & 3, 2010-11	155
Appendix I: Site FAIR Walkthrough Snapshots 1, 2 & 3, 2010-11	156
Appendix J: Principal Interview Protocol.....	157
Appendix K: Sample Grade 3, Partial Distractor Report.....	159
Appendix L: Sample CST Worksheet.....	160
Appendix M: District Management Retreat Summer 2010	161
References.....	165

List of Tables

Table 1. FAIR Inter-Rater Reliability	50
Table 2. School Demographics: Ethnicity, Socioeconomic Status, English Proficiency and Disability	67
Table 3. Sequence of the Whole-Class Peer Assessment Activity	109
Table 4. Teacher Questions.....	110
Table 5. Cognitive Level.....	112
Table 6. Responsiveness	113
Table 7. Teacher Follow-Up Responsiveness.....	115
Table 8. Teacher and Student Talk	118

Abstract

Formative Assessment, Equity, and Opportunity to Learn

Soleste Hilberg

This dissertation presents three studies that were designed to examine formative assessment from a sociocultural perspective. The first study presents the development, inter-rater reliability, and use of the Formative Assessment and Interaction Record (FAIR), which is a measure for documenting teachers' use of formative assessment and additional research-based instructional strategies. The FAIR was created to serve several interrelated purposes: (a) to document teachers' strategy use, (b) to allow teachers and schools to set specific goals for changes in instruction and to provide a means to document those changes, (c) to provide a tool for principals to use in their efforts to develop professional learning communities focused on equity in achievement, and (d) to encourage collaborative reflection and dialogue that is focused on the use of research-based strategies as a means to extend students' opportunities to learn. The goal of this study was to construct a reliable tool that could support district administrators and site principals in their collaborative efforts to increase teachers' use of formative assessment and equity-focused strategies.

The second study is a qualitative investigation of collaboration between site and district leaders to engage teachers in inquiry and analysis of teacher performance data and student assessment results, with a focus on formative assessment practices and their relationship to equity and opportunity to learn. Interviews were conducted

with principals from six elementary schools in a district serving a diverse student population with 49% socioeconomically disadvantaged students and 38% English learners. Results describe: how principals used teacher performance data to increase teachers' use of research-based formative assessment practices, the means by which principals facilitated the formative use of assessment data through teacher inquiry, and principals' perceptions of how this work relates to their goals of increasing achievement, equity, and opportunity to learn.

The final investigation is a case study of teacher-student dialogue in the context of a whole-class peer assessment activity to demonstrate how such formative assessment activities support the use of dialogic instruction. While numerous studies have documented the positive effects of dialogic instruction on student learning, little is known about the variety of classroom contexts that might prove more or less conducive to dialogic instruction. The research question addressed in this study was: Can formative assessment support a dialogic lesson structure? It was hypothesized that teacher-student interactions in the context of student assessment would include authentic, high-level teacher questions, high-level teacher responsiveness, a substantial proportion of time devoted to discussion, broad participation by students, and longer student responses than what is commonly associated with typical teacher-student dialogue. Results indicated that the whole-class peer assessment activity was consistent with features of dialogic instruction.

Dedication and Acknowledgements

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Chapter 1

Introduction

Formal education in the U.S. continues to struggle to equitably meet the needs of learners from diverse ethnic, language, and socioeconomic groups (Gándara, Maxwell-Jolly, & Rumberger, 2008). Many researchers argue that formative assessment interventions hold great promise for making significant inroads toward closing these achievement gaps (Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Natriello, 1987). Kluger and DeNisi (1996) hold, however, that given the mixed results of formative assessment intervention studies, more research is needed to better understand formative assessment practices. This introduction to three studies on formative assessment presents sociocultural theory as a basis for formative assessment, provides a review of the research literature on formative assessment, and presents a description of the context in which these studies occurred.

The concepts of equity and opportunity to learn served as a primary motivation for this work. Gutiérrez (2007) provides a conceptual framework for understanding and examining classroom equity. She defines equity as “fairness, not sameness” (p. 2), and proposes that equity has four dimensions: access, achievement, identity, and power. Equity of access refers to equity of the tangible resources of classrooms and schools, such as quality teachers, a rigorous curriculum, an environment that invites participation, reasonable class size, and support for learning beyond the classroom. Equity of achievement refers to equitable participation in

class, rigorous courses that create access to educational programs and career options, as well as successful performance on standardized tests. Equity of identity refers to equity in the presentation of content: it is important that all students can view the instructional content as a tool for their own use, and not just for those of the majority culture. Equity of power refers to issues of social transformation such as equity of voice in the classroom: who gets to talk in class, who determines the curriculum, and opportunities for students to see instructional content as a tool to analyze and evaluate society. Gutierrez asserts that all dimensions of equity are necessary to achieve equity in the classroom. Cazden (1988) further proposes that, “Educational purpose and equitable opportunity to learn remain the most important design principles. Both teachers and researchers need to monitor who participates and how, and who doesn’t and why” (p. 81). Equity is the basis for ensuring that all students are provided with sufficient opportunity to learn. The term equity in the studies reported here taps into all dimensions of equity: access to the teacher as a classroom resource for expanding individuals’ zones of proximal development (ZPDs); achievement through equity in participation in classroom activities and dialogue; the identity of each student as a learner who can achieve one’s own goals; and equity in power over who has the right to talk in class.

Sociocultural Theory and Formative Assessment

The research on formative assessment comes from multiple disciplines, primarily behavioral, cognitive, and social-psychology, and is based on numerous discipline-specific theories such as control theory, attribution theory, goal-setting

theory, or social cognition theory. It was not until recently that education researchers have begun to explore a sociocultural perspective as a basis for deepening our understanding of the role and value of formative assessment in learning and development (Ash & Levitt, 2003; Moss, Pullin, Gee, Haertal, & Young, 2008; Pryor & Crossouard, 2005). Although sociocultural theory stemmed initially from the work of L. S. Vygotsky (1978), current views of sociocultural theory have elaborated and further developed his initial work (cf. Wells & Mejía Arauz, 2006; J. Wertsch & Toma, 1995; J. V. Wertsch & Smolka, 1993). According to Wertsch and Toma (1995), there were three general themes in Vygotsky's work: first, that mental processes originate in social interactions; second, that understanding mental processes requires a developmental approach; and third, that all human action, individual and social, is mediated by semiotic as well as material artifacts. Each of these themes is briefly discussed, followed by discussion of the zone of proximal development, the difference between everyday and academic concepts, and the development of meaning and shared understandings.

Social origin of higher mental processes. One of Vygotsky's highly influential ideas concerns the origin of higher mental processes such as generalizing, ways of reasoning and interpreting, or problem solving. These are commonly referred to today as higher order thinking skills, mental dispositions, habits of thought, or habits of mind. Vygotsky (1981) proposed that the means that we use to perceive and process our world and our experience stem from our social interactions. Vygotsky maintained that when language, originating in our social communications, is

converted into inner speech, speech addressed to oneself, it begins to structure our mental processes. For example, it is through such social interactions as arguments between individuals in a community that individuals begin to develop such internal processes as reasoning, and the questions addressed to individuals initiate the development of the questions that individuals subsequently ask of themselves. The development of our intra-mental processes, including the capacities to reason, judge, engage in self-assessment, and reflect on our experiences, develops from the dialogic interactions in which we engage with others. Hasan (2002) contends that social interactions structure our mental dispositions, or habits of thought, such as how to respond in particular situations, what is worth our attention, how information is to be acquired, or how tasks are to be accomplished, all of which are applicable in formal learning contexts. For example, Rogoff and Mosier (1993) assert that there are cultural differences in the ways that children interact with caregivers, such as the purposes and means of using language in learning contexts and the ways children are guided to participate, that may or may not prepare children for the ways of learning they encounter in school.

Vygotsky's general genetic law of cultural development above has influenced recent understandings of learning. For example, Forman (1996) describes learning as a dialogic process that involves negotiations of meaning within activity, in which novices work toward expertise by engaging in *legitimate peripheral participation*, a concept introduced by Lave and Wenger (1991) in their studies of apprenticeship as the means by which novices become experts. Forman stresses, however, that learning

is not restricted to the internalization of information from the social world to create individuals' internal mental representations, and can be viewed as a socialization process characterized by increased participation in a given community. Cole (1985) maintains that we need a better understanding of the process by which external social actions spark individual mental processes. A discussion of semiotic mediation and the development of mental processes may shed some light on this process.

Semiotic mediation: The relationship between sign and thought. According to Vygotsky (1981), mental processes are fundamentally shaped or altered by the semiotic tools that are used. The devices, or signs, used by those in our communities, which embody not just the group's meanings but also its values, enable and guide us to make sense of our experiences in a manner that is congruous with that of others in the group (Wells, 2006). These tools consist of words, discourses, various symbolic systems, diagrams, assessment artifacts, and, most critically, language. The use of a semiotic tool does not merely facilitate an action or process that would have occurred regardless of the tool used; rather, the use of the tool alters the nature of the process itself, similar to the way the use of a technical tool, such as a computer as opposed to a typewriter, alters the flow of the labor used to accomplish the associated task (Vygotsky, 1981). Devices might be an object, a tool, a word, a mental representation, a discourse, an assessment, or even a questioning strategy. What learners can understand with a mediating device is different than what they can do without it (Gee, 2008).

Formation of mental processes. Vygotsky (1981) referred to the process by which mental actions are formed as “internalization.” He asserted that this is not merely the transfer of a semiotically-mediated intermental process to an intramental one, but rather a process through which an intermental process is restructured to create a related but metamorphosed intramental process. For example, arguments between individuals may lead to or inform reasoning. Some have proposed the notion of appropriation as an alternative to Vygotsky’s conception of internationalization (cf. Moschkovich, 2004; Rogoff, 1993; Wells 1999a) to imply a more dynamic process, one that is a more gradual construction and adaptation by the learner of the knowledge, skills, beliefs and values of others, encountered in dialogue and activity, which then are transformed as they become intramental tools for one’s own use and to accomplish one’s own goals.

Similar to the notion of appropriation, Bakhtin (1986) provides insight into how participation in discourse facilitates the appropriation of higher mental processes, stating that

the unique speech experience of each individual is shaped and developed in continuous and constant interaction with others' individual utterances. This experience can be characterized to some degree as the process of assimilation - more or less creative - of others' words (and not the language). Our speech, that is, all our utterances (including creative works), is filled with others' words, varying degrees of otherness or varying degrees of 'our-own-ness,' varying degrees of awareness and detachment. These words of others carry with them their own expression, their own evaluative tone, which we assimilate, rework and accentuate.
(1986)

Thus, though initiated and inspired by social interactions, mental processes and formations are unique individual creations that are transformed in the process of appropriation.

Zone of proximal development. Vygotsky (1978) was primarily interested in the development of mental formations, or thinking processes. He maintained that learning, however, is not the same as development, though it is a necessary precursor. To explain the relationship between learning and development, Vygotsky introduced the concept of the *zone of proximal development (ZPD)*, which he described as the difference between independent and assisted performance, independent performance indicating the developmental level and assisted performance indicating the level of potential development. This range between independent and assisted problem solving ability constitutes the ZPD. Determining the ZPD necessitates first determining or assessing a learner's current knowledge and abilities. Vygotsky maintained that learning is a necessary and universal aspect of an individual's development of "culturally organized" thinking processes (p. 90), and that learning *leads to* the development of the thought processes consistent with those with whom we interact. In other words, the learning of content, such as word meanings or problem-solving processes, establishes the foundation for the development of the thought processes used by the more experienced, more knowledgeable, and expert members of our culture.

Wells (2001) builds on Vygotsky's conceptualization, adding that the ZPD is not a fixed attribute of an individual but is determined within an activity and by the

available resources, or mediating devices. The ZPD can be conceptualized as a range of opportunity for learning that is created *within* a given activity by (a) the participants, (b) the knowledge, skills, beliefs, values, attitudes, orientations toward learning, and experiences contributed by participants, (c) the material resources or cultural artifacts available, and (d) the actions, dialogue, and processes in which the participants engage. Wells also proposes that the ZPD represents a dynamic conception of intellectual potential, and emphasizes the importance of the ZPD, noting Vygotsky's premise that, "what a child can do with assistance today she will be able to do by herself tomorrow" (1978, p. 87).

Central to the concept of the ZPD is the notion of *assisted performance*. According to Tharp and Gallimore (1988), assisted performance is a two-part process in which a learner's performance is first assessed, after which assistance is given that is responsive to both what the learner knows and is able to do, the developmental level at the lower end of the ZPD, and the learner's needs for successful participation at the upper end of the ZPD, the level of potential development. Tharp and Gallimore suggest a taxonomy of six means of assistance: direct instruction, modeling, rewards, feedback, questions, and cognitive structuring. Mercer (2002) presents an alternative, language-based taxonomy of responsive assistance that includes questioning, providing recaps or summaries, and elaborating or reformulating learners' contributions.

Vygotsky (1981) emphasized that it is implicit in the concept of ZPD that greater learning is afforded when instruction is directed beyond what a student is

capable of doing independently, and that assessment must be sufficiently sensitive and immediate that it can inform the provision of targeted assistance. Instructional activities, therefore, most effectively facilitate learning when they require the application of new skills or concepts and enable the teacher to monitor the limits of a student's unassisted level of performance as a basis for determining how to provide assistance. Expanding the ZPD increases an individual's opportunities for learning and subsequent development. This would imply that an important goal of instruction should be to assist learners to develop the agency and skills necessary to expand their own ZPDs through such self-assessment strategies as asking questions of themselves and others, seeking resources, or seeking the assistance of more capable others.

Everyday and academic concepts. Vygotsky defined concepts broadly as word meanings; he described important distinctions between everyday and academic concepts, which he referred to as spontaneous and instructed, respectively (1987). Everyday concepts are based on our experiences and are acquired without conscious effort in everyday activity and social interactions, while academic concepts, typically more abstract, relational, and general than everyday concepts, are integrated into systems of interconnected concepts, and are acquired primarily through instruction rather than experience. Vygotsky emphasized the importance of the relationship between everyday and academic concepts, which he described as ongoing, mutual influence: our everyday understandings inform and support our understanding of academic concepts, and our understanding of academic concepts reshapes our

informal understandings. Vygotsky proposed that concepts are fully developed when everyday and schooled coalesce into a cohesive, deeper understanding.

The development of meaning and shared understandings. Though Vygotsky focused on words as essential for the development of meaning, Bakhtin (1986) asserted that meaning can only be derived from utterances, or speaking turns, along with their interplay with others' preceding and subsequent utterances. Utterances, unlike individual words, can convey emotions, values, and expressions. Volosinov (1973) claimed that there is actually no such thing as an individual utterance; rather, an utterance is a product created between speakers: from the speaker to the intended listener. This understanding is consistent with Bakhtin's conception of an utterance as having both an author and an addressee, and his position that utterances are created in anticipation of a response from the addressee. In learning to speak, we initially ventriloquate the utterances of others by trying them out in various contexts and applying them in a range of purposes; later we are able to transform and appropriate them so that they become personal tools to achieve our own goals. Regardless, utterances continue to maintain aspects of their observed use by others; this is referred to as the multi-voiced aspect of utterances (Bakhtin, 1986, as described in Wells, 2001b).

Bakhtin further held that our understanding of others' utterances is deepened by the words and utterances that we form in response to others, whether we articulate them or not, and Wells (2006) asserts that our own understanding is also often deepened by our efforts to communicate our understandings to others. Furthermore,

Bakhtin stated that it is our interactions with others, our conflicts, disagreements, and arguments, that most promote the development of our thinking.

Utterances are created from typical forms, styles, situations, or contexts, referred to as speech genres, which vary tremendously across a number of dimensions such as activity, context, social status, degree of intimacy, tone, and historical period, and which contribute significantly to meaning and shared understandings (Bakhtin, 1986). Wells (2006) and Halliday (1993) emphasized the critical role that joint activity with mature members of one's culture, accompanied by utterances that describe or comment on the shared experience, plays in the development of shared meanings and values. Volosinov (1973) further claimed that utterances cannot be understood outside of the specific activity within which they occur.

Together, these concepts suggest that learning and development occur in interaction and discourse in shared activity between individuals with varying levels of expertise. Language plays a key role in the development of shared understandings. These shared understandings, as well as thinking processes, attitudes, and values, are appropriated by individuals for later self-directed application in novel activity. Moran and John-Steiner (2003) remind us of Vygotsky's (1978) proposition that it is through our interactions with others that we develop self-awareness: "If the thought of the child did not meet with the thoughts of others, the child would never become conscious of himself" (p. 72).

Formative Assessment

Sociocultural theory offers some insight into the research findings on formative assessment. Black and Wiliam (1998b) claim that systematic use of formative assessment will not only result in learning gains for all students, it will provide the greatest gains for the lowest performing students, and thus reduce gaps in achievement. Ash & Levitt (2003) and Black & Wiliam (1998b) describe formative assessment as a two-part process in which learners—teachers or students—first assess the gap between what they know or are able to do and the learning goal, and then take action to close that gap to attain the desired goal. From a sociocultural perspective, formative assessment can be described as responsive assistance in the zone of proximal development, the process of first assessing an individual’s current knowledge and abilities and then, based on that initial assessment, providing the assistance necessary to assist the learner achieve what he or she is not yet able to do independently in the upper reaches of their zone of proximal development. Black and Wiliam (1998a) maintain that assessment is an inherently social process, and use the term “formative assessment” to refer to any classroom actions, by teachers or by students, that provide information used to inform the teaching or learning of instructional content, processes, or strategies, including self-assessment and metacognitive strategies. Moss, Girard, and Greeno (2008) concur, and add that assessment practices, as well as the social context in which they are embedded, shape learners’ understandings about both the nature of learning, as well as about themselves as learners. Crooks (1988) documents a wide range of purposes associated

with formative assessment including eliciting relevant prior knowledge, focusing attention on key concepts, facilitating the development of effective learning strategies, providing opportunities for students to apply their understandings, developing greater understandings, revealing and rectifying misconceptions, and the development of self-evaluation and self-monitoring strategies. Meta-analyses of decades of research from multiple disciplines and based on numerous discipline-specific theories such as control theory, attribution theory, goal-setting theory or social cognition theory, highlight the importance of three key formative assessment strategies in promoting student learning: feedback, questioning, and self-assessment (Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Natriello, 1987), which are central to the studies reported here.

Feedback. There is extensive research that supports the value of feedback in promoting learning. Feedback is one of the six means of assistance that Tharp and Gallimore (1988) describe for assisting learners to participate successfully at the upper ends of their ZPDs. Hattie and Timperley (2007) argue that feedback is among the ten most influential factors related to student achievement. Feedback is an inherent aspect of all formative assessment practices, and is relevant to both teachers and students. Teachers obtain feedback from students and the classroom environment through observation, examining student work, and dialogue with students. Feedback to students is derived from a wide variety of sources such as the teacher, a peer, the self, a text, the Internet, or a computer program, and can be accomplished through numerous means such as questioning; marking or commenting on performance or

products such as projects, papers, worksheets, and responses; checklists or rubrics; informal observations; computer assisted instruction; providing informative hints, cues, analogies, explanations, or examples; and tests or quizzes (Crooks, 1988).

Feedback is most effective if it addresses three questions (Black & Wiliam, 1998a; Hattie & Timperley, 2007): First, what is the goal? Second, what progress is being made toward the goal (i.e., assessing the gap between the current state and the goal)? And third, what is needed to achieve the goal (i.e., what steps must occur to close the gap between the current state and the goal)? These questions pertain to the ZPD: the goal being the upper reaches of the ZPD, the gap being the difference between independent and assisted performance, and what is needed to achieve the goal being the responsive assistance provided. When feedback is provided in the context of achieving a goal, a learner is more likely to appropriate the meta-cognitive strategies of more experienced learners to regulate his or her actions toward that goal such as planning, allocating resources prior to learning, organizing or summarizing information, monitoring understanding, and evaluating strategy use (Bandura & Cervone, 1983; Bandura & Schunk, 1981; Schraw & Sperling-Dennison, 1994).

The research findings on outcomes that result from feedback do not address a consistent set of parameters and therefore the reported findings are sometimes seemingly contradictory, thus making conclusions across studies difficult to derive. Individual factors examined in some studies include self-efficacy, ability, locus of control, level of confidence, and age of the learner. These factors interact with other variables such as types of feedback, extent of elaboration of feedback, or the product

on which the feedback is based, with no consistency in conclusions that apply across learner or assessment characteristics. For example, Mathan and Koedinger (2002, as cited in Shute, 2008) and Moreno (2004) reported that novice learners and low-ability learners benefit more from explanatory feedback than corrective or verification feedback, while Bangert-Drowns et al. (1991, as cited in Shute, 2008) reported that corrective feedback is generally more beneficial than verification feedback but did not consider the experience level of the learner. A second example of the seeming complexity of reported findings is from Crooks (1988) who looked at teacher feedback on students' incorrect responses to higher-level questions and found that feedback that helps identify the source of the misunderstanding is most effective for students who are *confident* in their own accuracy, whereas feedback that provides conceptual explanations is most effective for students who are *less confident*. Third, Crooks (1988) and Shute (2008) contend that providing effective feedback on student responses depends on the accuracy of the student response, the degree of the student's confidence, and the nature of the question itself: Teacher feedback on incorrect student responses to higher-level questions for which students are *confident* in their own accuracy calls for assistance identifying the source of the misunderstanding, while teacher responses to incorrect student responses to higher-level questions for which students are *not confident* in their own accuracy call for conceptual explanations. Though these findings may be of use in such applications as the design of appropriate feedback for adaptive computer software, the level of complexity renders them impractical for use by teachers in their everyday classroom interactions

with students. Regardless, it can be generally concluded that feedback is most effective when it is targeted, sufficiently elaborated, and timely, meaning that learners have opportunities to incorporate the feedback to improve their abilities or understandings.

Feedback should be targeted at the appropriate level. In an extensive review on feedback, Hattie and Timperley (2007) concluded that a key theme across studies is the importance of ensuring that feedback is targeted at an appropriate level for the learner. Feedback that is aimed too high, beyond what the learner can do with assistance at the upper reaches of the ZPD, may be too difficult for the learner to comprehend and apply, and feedback aimed too low, below a learner's independent performance level, may not motivate learning and will not extend learning or development. In another review, Natriello (1987) found that low-achieving students who received differentiated, specific, and individualized feedback attributed their success to their efforts rather than to their personal abilities. Such attributions are important in learning because they are related to motivation and persistence. The most effective feedback focuses learners on making personal progress and on mastering the learning goal, rather than on comparing personal performance to that of others (Black & Wiliam, 1998b; Crooks, 1988). The latter is more likely to have a negative effect on learning.

Feedback should be sufficiently elaborated. Sociocultural theory posits that our interactions with others provide the feedback that most promotes the development of our thinking and understandings. Black and Wiliam (1998a) proposed two main

functions of feedback: directive and facilitative. Directive feedback is specific and informs students what needs revision; facilitative feedback is less specific and can be thought of as providing general guidance in the form of comments, questions, or suggestions. The extent of elaboration of feedback, ranging from mere acknowledgments to elaborated conceptual explanations, is also a factor in its effectiveness. Hattie and Timperley (2007) contend that studies finding the greatest benefits from feedback were those in which students received both information about the task and how to do it more effectively. This typically involved a high degree of elaboration, supporting Shute's (2008) contention that learning is enhanced by elaborated feedback, provided that it is specific and clear.

Learners need opportunities to incorporate feedback. Feedback is most helpful when it is timely so that students have opportunities to apply it to improve their work and their understandings (Bransford, Brown, & Cocking, 2000). Without these opportunities, misconceptions are likely to persist and learners are more likely to misjudge the degree to which they really understand (Shavelson, Webb, Stasz, & McArthur, 1988, as cited in Webb, Nemer, & Ing, 2006). Opportunities to incorporate feedback also result in greater motivation, improved self-efficacy, and reduced anxiety (Crooks, 1988).

Questioning. Sociocultural theory provides a basis for the value of questioning in the development of higher mental processes. The questions that are asked of learners in their interactions with others spark the development of the questions that learners later ask of themselves in their reasoning and problem solving.

Questions are appropriated by individuals as semiotic tools that mediate the ways in which they engage in activity and how they perceive their experiences. Questioning plays a critical role in formative assessment. Feedback on learners' understandings is derived primarily from asking and answering questions, which can be generated or responded to by both the teacher and the learner. Another important function of questioning is to guide student thinking and problem solving. Research has demonstrated that use of higher-level questions increases learning, retention, transfer, interest, and the development of more effective learning strategies (Crooks, 1988).

The effects of the use of different cognitive levels of questions have been examined with a range of learner characteristics such as high- and low-ability learners, novice and experienced learners, confident and non-confident learners, learners of different ages, and the correctness of the learner's initial performance or response (Black & Wiliam, 1998b; Bransford, Brown, & Cocking, 2000; Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Moreno, 2004; Natriello, 1987; Shute, 2008). In his meta-analysis of research on classroom evaluation that spanned 14 different disciplines, Crooks (1988) concluded that there is a strong case for the consistent use of higher-level questions that engage students in higher-level cognitive processes such as categorization, summarization, or evaluation. Such questioning is most effective in promoting learning if the difficulty level is such that questions can most often be answered correctly and when sufficient wait time is provided. Again, we see findings consistent with responsive assistance in the ZPD. Crooks asserts that such questioning will not only increase learning, it is also

associated with student use of deep processing strategies, which involve learners in searching for meaning and underlying principles, rather than surface strategies, which focus learning on the memorization of isolated facts and unrelated topics. Such learning is not retained, whereas the information acquired through deeper processing, focused on meanings and core concepts, is remembered and is more likely to be applied in new learning contexts. Bransford et al. (2000) concur with Crooks and add that students need explicit instruction in how and when to apply their newly acquired conceptual understandings.

Black & Wiliam (1998b) and Crooks (1988) contend that another highly valuable use of questioning is to elicit and explore students' prior knowledge. Bransford et al. (2000) assert that an essential part of teaching is to find ways to incorporate learners' preexisting understandings into instruction and to make learners' thinking processes and problem-solving strategies available to the classroom community. Eliciting relevant prior knowledge in instruction allows for important information to be at hand to help learners make critical connections between prior understandings and new instructional content. Such elicitation also facilitates deeper processing of new concepts as learners attempt to reconcile previous and developing understandings.

Self and peer assessment. A premise of sociocultural theory is that responsive assistance expands the range of possibilities for learning in the ZPD. This would suggest that a goal of instruction should be to assist learners to develop the agency and skills necessary to expand their own ZPDs through such self-assessment

strategies as asking questions of themselves and others, seeking resources, or seeking the assistance of more capable others. Self and peer assessment is a form of formative assessment and serves two primary functions. First, engaging students in assessment of their own or a peer's work helps students monitor their own understandings. Second, it initiates student planning and regulation of their own actions to achieve a learning goal. It also generates internal feedback, facilitates efforts to seek and incorporate feedback, and increases students' efforts to seek help (Hattie & Timperley, 2007). According to Black & Wiliam (1998b), self and peer assessment also plays a central role in identifying and rectifying students' misconceptions.

Self assessment is also an important component of metacognition. According to Bransford, Brown, and Cocking (2000), teachers should develop a culture of inquiry among learners and strategically integrate the teaching of self assessment and metacognitive strategies within subject-matter instruction. Such efforts help students learn to assess their own performance and monitor their understandings and progress, which, in turn, increase students' abilities to consciously regulate their use of these strategies. This also results in an increase in students' efforts to obtain and apply feedback, and such help-seeking actions are associated with increased motivation and persistence (Hilberg, Joshi, & House, 2009).

A key finding from research on formative assessment is that classroom assessments, both formal and informal, are often not aligned with either the most important instructional content or the most valued student abilities. Though instruction and curricula may emphasize higher-level processes such as

comprehension, synthesis, or inference, assessments tend to emphasize the recall of isolated details and consequently encourage superficial and rote learning (Black & Wiliam, 1998b). Crooks (1988) maintains that, because formative assessment is so powerful in focusing learners' attention, and, depending on how it is provided, guides learners to either focus on the surface learning of isolated facts or to engage in deep learning of meanings and core concepts, it is critical that formative assessment targets the skills, knowledge, strategies, and processes that we most want to engender in learners.

Convergent and divergent forms of formative assessment. The research on formative assessment makes a strong case for the strategic use of higher-level questioning, effective feedback, and student self or peer assessment. However, Pryor and Crossouard (2005) have recently begun to explore a dimension of formative assessment not found in the research cited above. They describe formative assessment practices as convergent or divergent: convergent practices assess *whether* a student is learning, and divergent practices assess *what* a student is learning. They contend that convergent formative assessment practices stem from behaviorist notions of learning and that divergent practices stem from a constructivist perspective. They also propose that convergent formative assessment is typically accomplished in the context of the well-known teacher-student IRF interaction pattern: teacher initiation (I), student response (R), followed by some kind of teacher follow-up (F). In convergent formative assessment practices, IRF most often occurs by the teacher asking a

question or assigning a task for which there is a clear idea of a correct response, followed by feedback on how the learner's response matches the correct one.

On the other hand, Pryor and Crossouard (2005) describe divergent formative assessment practices as occurring in the context of dialogic interactions that are more conversational in nature than the common IRF interaction pattern, in which questions are asked for which there may be no previously known correct response. They characterized divergent questions as more often having the goal to help rather than evaluate. Teacher follow-up to student responses, or feedback, was more exploratory or generative, often prompting for more engagement and greater detailed explanations of the learner's reasoning, and with diminished attention to student mistakes.

Similarly, Wells (2009) reported that teacher-student dialogue in an inquiry action research project was more negotiatory and dialogic, and more often initiated by students. He also reported that teacher questioning was more often used to generate discussion rather than to request known information. These observations suggest that instructional practices, such as those resulting from divergent formative assessment and inquiry, in which teachers seek to better understand their students' knowledge and skills, and elicit students' questions, explanations, and elaborations, may alter the nature of teacher-student dialogue. Nystrand, Gamoran, Kachur and Prendergast (1997) contend that learning to think relies on active engagement in effective interactions much like those described by Pryor and Crossouard (2005) as divergent formative assessment practices, and that these interactions are closely associated with student learning. Wells agrees and suggests that "opportunities for learning and

knowing are crucially dependent on the nature of the activities in which students engage and on the functions that language performs in these activities” (2001b, p. 12). Many sociocultural theorists have held that there are two basic functions of discourse: a monologic function, which is to convey meaning, and a dialogic function which is to create meaning (Gutiérrez, 1993; Nystrand, Gamoran, Kachur, & Prendergast, 1997; Wells, 2007; Wertsch & Toma, 1995). These functions are consistent with the constructs of convergent and divergent formative assessment practices described by Pryor and Crossouard (2005). In the monologic function, discourse is intended to be communicated to and received by others and is not intended to be open to interpretation, questioned, or responded to. The content of monologic discourse is considered objective and static. The dialogic function, on the other hand, is to use language to generate new meanings and understandings through the exchange of ideas. Knowledge is treated as personal, emerging, and incomplete, and is thought to be created in dialogue between people engaging in shared activity.

Dual Roles of the Researcher

Prior to beginning the research reported here, I began working as the Assessment Coordinator for a school district in Northern California with 7,142 students: 46% Hispanic/Latino, 9% African American/Black, 12% Asian, 21% White, 10% Filipino, 3% Pacific Islander, 42% participated in the National School Lunch Program, and 21% English learners. The district had eight elementary schools, one junior high school, one comprehensive high school, a Community Day high school

and junior high, an alternative education high school, an independent study high school, and an adult high school.

I continued in that position, though with expanded duties including coordinating the English Learner Program and Title III Accountability, for four years. In my second year, I arranged to work closely with a principal at one of the district's Title I elementary sites. She was interested in collaborating to work with teachers at her site to increase their classroom use of formative assessment. This collaboration formed the basis for a study on the development, reliability, and use of the Formative Assessment and Interaction Record (FAIR), the first study reported here. I also formed close working relationships with many of the district's principals who were interested in increasing teachers' formative use of assessment data. We collaborated to bring an online assessment system to the district and to develop professional development protocols to engage teachers in analysis of assessment data to better understand and more effectively respond to student learning needs. This collaboration formed the basis for the second study presented here on principals' formative use of assessment data. The final study reported here resulted from a collaboration with a sixth-grade teacher. The study examined teacher-student dialogue in a whole-class peer assessment activity to demonstrate the degree to which it was dialogic.

Teacher professional development on formative assessment. During the 2009-10 school year, I collaborated with an elementary school principal to increase teachers' use of formative assessment strategies, focusing on feedback, questioning strategies, and engaging students in self and peer assessment. The initial phase of this

work consisted of engaging staff in six one-hour professional development sessions on formative assessment, designed and delivered by the principal and myself. The design of the professional development intervention was guided by principles of andragogy (Knowles, 1975, 1984), adult learning theory, that contend that adult learners value: (a) self-direction in planning and evaluating their own learning, (b) learning from experience, (c) learning that is immediately applicable to their work or personal lives, and (d) an inquiry approach to learning that is problem centered rather than topic centered. All sessions focused on the three focus formative assessment strategies: questioning, feedback, and student self and peer assessment.

The first session on September 8th (see Appendix A) provided teachers with an overview of formative assessment and research on associated achievement outcomes. Teachers engaged in a focused reading and discussion activity using an article on formative assessment, “*Classroom Assessment: Minute by Minute, Day by Day*” (Leahy, Lyon, Thompson, & Wiliam, 2005), viewed a seven-minute video clip of Richard Stiggins presenting the research basis for formative assessment, and then created individual and consensus graphs (see Appendix B) on their perceptions of the value of formative assessment for equitably serving the students at their site.

The second session, October 12th, focused on questioning as a formative assessment strategy. This occurred as part of the site annual retreat. In this session (see Appendix C), teachers first engaged in an overview of questioning taxonomies and the research on achievement outcomes associated with teacher questioning. They then engaged in an activity designed to elicit their prior knowledge and experiences

with questioning strategies, followed by an activity in which they ranked the appropriateness of the various questioning strategies on three different levels: level of difficulty, level of familiarity, and level of importance. Using that as the basis, each grade level selected two questioning strategies to integrate into their instruction throughout the coming school year.

The third professional development session on December 9th (see Appendix D) focused on feedback within the context of mathematics instruction. Teachers first shared the types and modes of feedback that they provided to students and how they structured opportunities for students to incorporate feedback to improve work products and understandings. Teachers then viewed a videotape of one of their colleagues sharing how she used mastery learning, providing multiple opportunities to perform at a high level, to provide feedback and to motivate students. In addition, teachers examined a taxonomy of eleven attributes of effective feedback and selected one attribute to incorporate into their practice over the coming month. This session concluded with teachers sharing their experiences and their ideas for providing feedback and opportunities for students to incorporate feedback to improve their work and understandings.

The fourth session on January 19th (see Appendix E) focused on student self assessment in the context of writing. Teachers were provided with a resource packet with a number of exemplar writing rubrics. Teachers then collaborated in grade-level teams to generate student-friendly writing rubrics.

The topic of the fifth session on January 26th was again feedback. At this session, teachers first shared their experiences and the effects that they observed the feedback had on students. They also evaluated the value of the various feedback attributes, and then chose a new attribute on which to focus in the coming weeks.

The principal and I designed a sixth session to occur in February at which we would ask teachers to reflect on and self-assess their use of formative assessment strategies, rating both their current practice and that from the previous year, using a 4-point scale (see Appendix F). In preparing for this session, we reflected on the degree to which we had applied formative assessment strategies ourselves in our professional development work with teachers. In rating our strategy use, with two exceptions, we rated our use of formative assessment strategies at the two higher levels of implementation: “sometimes” and “consistently and strategically.” The two exceptions were the two feedback items: (a) all teachers receive continuous, descriptive feedback, and (b) all teachers have opportunities to incorporate feedback to improve their work. This was an “ah-hah” moment for us and marked a significant shift in the direction of our work. In conducting our own self-assessment, we realized that if we wanted to assist teachers to use formative assessment strategies more consistently and more strategically, we would need to model the use of all the strategies, including providing teachers with feedback and opportunities to incorporate the feedback to improve their practice and understanding.

At that time, I was the chair of the district’s English Learner Program Advisory (ELPA) Committee, on which the principal served. The focus of our

collaboration in ELPA was to increase teachers' use of research-based instruction for English learners as a response to district Title III Program Improvement sanctions. The work on formative assessment was merged with district efforts to invigorate the English learner program: both were viewed as contributing to the district's focus on equity, defined by the National Equity Project as "Ensuring equally high outcomes for all participants in our educational system; removing the predictability of success or failure that correlates with any social or cultural factor; and interrupting inequitable practices, eliminating biases, and creating inclusive multicultural school environments for adults and children" (Osta & Perrow, 2008). Our goal became the development of a tool, contextualized in district reform efforts in both formative assessment and effective instruction for English learners, that would assist us to implement two formative assessment strategies in our professional development work with teachers: providing "friendly" learning targets and providing feedback with opportunities to incorporate the feedback to improve performance and deepen understandings.

This launched our work to develop the Formative Assessment and Interaction Record (FAIR). The FAIR is a classroom observation tool developed collaboratively by principals and district administrators to assist their efforts to better understand the quality of teaching in the district, for increasing teachers' use of formative assessment and additional research-based strategies focused on English learners, and to allow the district and sites to set goals for instructional change and to monitor progress toward achieving those goals. All of these efforts relied on having an instrument that would

reliably capture teachers' use of the targeted instructional strategies. The first study reports on the development, inter-rater reliability, and use of the FAIR. The second study presents a qualitative analysis of principals' use of both FAIR data and student assessment data to engage their teachers in efforts to increase equity and opportunity to learn using a two-pronged approach: first, to increase the use of formative assessment strategies and additional research-based strategies, and second, to engage teachers in data-informed conversations about student achievement. The final study presents a discourse analysis of teacher-student dialogue in a whole-class formative assessment activity to determine in what ways it is consistent with dialogic instruction. It is my hope that together these papers will deepen our understanding of formative assessment from a sociocultural perspective of teaching and learning, as well as the relationship between instruction, equity, and opportunity to learn. Equity and opportunity served as the primary motivation for this work with the premise that increasing teachers' use of formative assessment will expand students' opportunities to learn and thereby increase classroom equity.

Chapter 2

Formative Assessment and Interaction Record (FAIR):

Development, Inter-Rater Reliability, and Use

Formal education in the U.S. continues to struggle to equitably meet the needs of learners from diverse ethnic, language, and socioeconomic groups (cf. Gándara, Maxwell-Jolly, & Rumberger, 2008; Hall, 2005; National Center for Educational Statistics, 2005). While there is considerable research on the effectiveness of formative assessment in increasing learning, only recently have researchers begun to explore the relationship between formative assessment and issues of equity in education (Moss, Girard, & Greeno, 2008). The research reported here describes collaborative action research among school district leaders to develop a tool, the Formative Assessment and Interaction Record (FAIR), to support their work to increase the use of formative assessment and other research-based strategies focused on English learners with the goal of promoting greater opportunity to learn in classrooms. This paper presents the theory and rationale guiding the development of the FAIR, the items on the FAIR, and a quantitative analysis to determine the level of inter-rater reliability between observers. For instruments such as the FAIR, high inter-rater reliability is critical if the data gathered are to be considered accurate estimates of the constructs being observed. Without establishing sufficiently high inter-rater reliability, data and subsequent analyses have no meaning. The research question addressed here is: Can a reliable tool be developed that will allow observers to

document use and changes in use of formative assessment and additional research-based strategies?

What is Formative Assessment?

Assessment is a fundamental aspect of education in the U.S. The value of assessment in increasing a broad range of student outcomes such as achievement, motivation, and self-efficacy has been studied across numerous disciplines for several decades (Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Natriello, 1987; Shute, 2008). The literature on assessment distinguishes between summative and formative assessment: Summative assessments typically take the form of tests or grades on student products to *assess* teaching and learning *after* instruction, whereas formative assessments typically rely on a much broader range of cues to *inform* teaching and learning *during* instruction.

There is a broad range in the time span over which formative assessment may inform teaching and learning, from analysis of assessment data to inform instruction in the coming quarter, trimester, semester, or year, on the one hand, to observing or asking questions of a student to determine the assistance needed in the moment to deepen learning or improve performance, on the other. Formative assessment strategies include teachers' oral or written comments on student work or performance, oral and written questioning that informs subsequent teaching and learning, formal or informal observations, self assessment and self-monitoring strategies by students, and, more recently, group-monitoring strategies such as requesting that students monitor their understanding and respond positively (e.g. thumbs up) when they

understand and negatively (e.g. thumbs down) when they do not. Many forms of assessment can serve both summative and formative functions. For example, a summative test becomes formative when it is used by teachers to respond instructionally or by students to deepen understandings.

Equity and Opportunity to Learn

An important focus of the collaboration reported here is that of educational equity, which Gutiérrez (2007) defines equity as “fairness, not sameness” (p. 2). She proposes four dimensions of equity: access, achievement, identity, and power, and she asserts that all four dimensions are necessary to achieve equity in the classroom. Additionally, all of these dimensions of equity, or the lack thereof, have implications for opportunities to learn and access to resources in classrooms, including arguably the primary classroom resource: the teacher. It is in interactions with the teacher and other adults that students have opportunities to appropriate the language, knowledge, strategies, and thinking processes of the more expert others in the classroom. Tharp and Gallimore (1988) contend that achieving equity in the classroom will require opportunities for the teacher to assess and assist individual learners, and that it is critical that each learner’s prior understandings be elicited and integrated with new instructional content.

Greeno and Gresalfi (2008) contend that differences in the knowledge and experience that students bring to the classroom produce differences in students’ abilities to perceive and respond to the opportunities provided. As Wertsch and colleagues (1995) note, “although cultural tools shape action, they do not determine

it...they can have their impact only when individuals use them” (p. 22). Success in the classroom relies on teachers to perceive and apply relevant information from and about students, and for students to perceive and apply information about themselves as well as information from the teacher. Consequently, formative assessment, or information used to inform teaching and learning, is a necessary component of effective instruction because it informs the teacher of student understandings, which in turn inform instructional decisions, and informs learners about their own understandings, which can then inform their actions to further their own learning.

Sociocultural Theory

The research on formative assessment comes primarily from behavioral, cognitive, and social psychology and is based on numerous discipline-specific theories such as control theory, attribution theory, goal-setting theory, or social cognition theory. It was not until recently that educational researchers have begun to explore a sociocultural perspective as a basis for deepening our understanding of the role and value of formative assessment in learning and development (Ash & Levitt, 2003; Moss, Pullin, Gee, Haertal, & Young, 2008; Pryor & Crossouard, 2005).

Sociocultural theory posits that the means that we use to perceive and process our world and our experience stem from our social interactions (Vygotsky, 1981). When language, originating in our social communications, is converted into inner speech, which is speech addressed to oneself, it begins to structure our mental processes, including the capacities to reason, judge, engage in self-assessment, and reflect on our experiences. Mental processes are fundamentally shaped or altered by

the semiotic tools that are used (Vygotsky, 1981). These tools consist of words, discourses, various symbolic systems, diagrams, assessment artifacts, and, most critically, language. What learners can understand with a mediating device is different than what they can do without it (Gee, 2008). Vygotsky (1981) referred to the process by which mental processes are formed as “internalization.” He asserted that this is not merely the transfer of a semiotically-mediated intermental process to an intramental one, but rather a process through which an intermental process is restructured to create a related but metamorphosed intramental process.

While Vygotsky (1978) was primarily interested in the development of mental formations, or thinking processes, he maintained that learning, however, is not the same as development, though it is a necessary precursor. To explain the relationship between learning and development, Vygotsky introduced the concept of the *zone of proximal development* (ZPD), which he described as the difference between independent and assisted performance, independent performance indicating the developmental level and assisted performance indicating the level of potential development. This range between independent and assisted problem solving ability constitutes the ZPD. Determining the ZPD necessitates first determining or assessing a learner’s current knowledge and abilities. The ZPD is not a fixed attribute of an individual but is determined within an activity and by the available resources, or mediating devices (Wells, 2001). The ZPD can be conceptualized as a range of opportunity for learning that is created *within* a given activity by (a) the participants, (b) the knowledge, skills, beliefs, values, attitudes, orientations toward learning, and

experiences contributed by participants, (c) the material resources or cultural artifacts available, and (d) the actions, dialogue, and processes in which the participants engage. Wells also proposes that the ZPD represents a dynamic conception of intellectual potential, and emphasizes the importance of the ZPD, noting Vygotsky's premise that, "what a child can do with assistance today she will be able to do by herself tomorrow" (1978, p. 87).

Central to the concept of the ZPD is the notion of *assisted performance*.

According to Tharp and Gallimore (1988), assisted performance is a two-part process in which a learner's performance is first assessed, after which assistance is given that is responsive to both what the learner knows and is able to do, the developmental level at the lower end of the ZPD, and the learner's needs for successful participation at the upper end of the ZPD, the level of potential development. Tharp and Gallimore suggest a taxonomy of six means of assistance: direct instruction, modeling, rewards, feedback, questions, and cognitive structuring

Together, these concepts suggest that learning and development occur in interaction and discourse in shared activity between individuals with varying levels of expertise. Language plays a key role in the development of shared understandings. These shared understandings, as well as thinking processes, attitudes, and values, are appropriated by individuals for later self-directed application in novel activity.

Formative Assessment

Sociocultural theory offers some insight into the research findings on formative assessment. Black and Wiliam (1998b) claim that systematic use of

formative assessment will not only result in learning gains for all students, it will provide the greatest gains for the lowest performing students, and thus reduce gaps in achievement. Ash & Levitt (2003) and Black & Wiliam (1998b) describe formative assessment as a two-part process in which learners—teachers or students—first assess the gap between what they know or are able to do and the learning goal, and then take action to close that gap to attain the desired goal. From a sociocultural perspective, formative assessment can be described as responsive assistance in the zone of proximal development, the process of first assessing an individual’s current knowledge and abilities and then, based on that initial assessment, providing the assistance necessary to assist the learner to achieve what he or she is not yet able to do independently in the upper reaches of their zone of proximal development. Black and Wiliam (1998a) maintain that assessment is an inherently social process, and use the term “formative assessment” to refer to any classroom actions, by teachers or by students, that provide information used to inform the teaching or learning of instructional content, processes, or strategies, including self-assessment and metacognitive strategies. Moss, Girard, and Greeno (2008) concur, and add that assessment practices, as well as the social context in which they are embedded, shape learners’ understandings about both the nature of learning, as well as about themselves as learners. Meta-analyses of decades of research highlight the importance of three key formative assessment strategies in promoting student learning: feedback, questioning, and self-assessment (Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Natriello, 1987).

Feedback. There is extensive research that supports the value of feedback in promoting learning. Feedback is one of the six means of assistance that Tharp and Gallimore (1988) describe for assisting learners to participate successfully at the upper ends of their ZPDs. Hattie and Timperley (2007) argue that feedback is among the ten most influential factors related to student achievement. Feedback is an inherent aspect of all formative assessment practices. Teachers obtain feedback from students and the classroom environment through observation, examining student work, and dialogue with students. Student feedback is derived from a wide variety of sources such as the teacher, a peer, the self, a text, the Internet, or a computer program, and can be accomplished through numerous means such as questioning; marking or commenting on performance or products such as projects, papers, worksheets, and responses; checklists or rubrics; informal observations; computer assisted instruction; providing informative hints, cues, analogies, explanations, or examples; and tests or quizzes (Crooks, 1988).

Feedback is most effective if it addresses three questions (Black & Wiliam, 1998a; Hattie & Timperley, 2007): First, what is the goal? Second, what progress is being made toward the goal (i.e., assessing the gap between the current state and the goal)? And third, what is needed to achieve the goal (i.e., what steps must occur to close the gap between the current state and the goal)? These questions pertain to the ZPD: the goal being the upper reaches of the ZPD, the gap being the difference between independent and assisted performance, and what is needed to achieve the goal being the responsive assistance provided. When feedback is provided in the

context of achieving a goal, a learner is more likely to appropriate the meta-cognitive strategies of more experienced learners to regulate his or her actions toward that goal such as planning, allocating resources prior to learning, organizing or summarizing information, monitoring understanding, and evaluating strategy use (Bandura & Cervone, 1983; Bandura & Schunk, 1981; Schraw & Sperling-Dennison, 1994). Feedback is most effective when it is targeted, sufficiently elaborated, and timely, meaning that learners have opportunities to incorporate the feedback to improve their abilities or understandings. Targeted feedback is responsive to individual students' learning needs and is most effective when it is targeted on a learner's ZPD. Feedback that is aimed too high, beyond that which the learner can do with assistance at the upper reaches of the ZPD, may be too difficult for the learner to comprehend and apply, and feedback aimed too low, below a learner's independent performance level, may not motivate learning and will not extend learning or development.

Sociocultural theory posits that our interactions with others provide the feedback that most promotes the development of our thinking and understandings. Studies finding the greatest benefits from feedback were those in which students received both information about the task and how to do it more effectively (Hattie & Timperley, 2007). This typically involved a high degree of elaboration, supporting Shute's (2008) contention that learning is enhanced by elaborated feedback, provided that it is specific and clear.

It is important that students have opportunities to apply feedback to improve their work and their understandings (Bransford, Brown, & Cocking, 2000). Without

these opportunities, misconceptions are likely to persist and learners are more likely to misjudge the degree to which they really understand (Shavelson, Webb, Stasz, & McArthur, 1988, as cited in Webb, Nemer, & Ing, 2006). Opportunities to incorporate feedback also result in greater motivation, improved self-efficacy, and reduced anxiety (Crooks, 1988).

Questioning. Sociocultural theory provides a basis for the value of questioning in the development of higher mental processes. The questions that are asked of learners in their interactions with others spark the development of the questions that learners later ask of themselves in their reasoning and problem solving. Questions are appropriated by individuals as semiotic tools that mediate the ways in which they engage in activity and how it is perceived. Questioning plays a critical role in formative assessment. Feedback on learners' understandings is derived primarily from asking and answering questions, which can be generated or responded to by both the teacher and the learner. Another important function of questioning is to guide student thinking and problem solving. Research has demonstrated that use of higher-level questions increases learning, retention, transfer, interest, and the development of more effective learning strategies (Crooks, 1988).

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questioning will not only increase learning, it is also associated with student use of deep processing strategies, which involve learners in searching for meaning and underlying principles, rather than surface strategies, which focus learning on the memorization of isolated facts and unrelated topics. Such learning is not retained, whereas the information acquired through deeper processing, focused on meanings and core concepts, is remembered and is more likely to be applied in new learning contexts. Bransford et al. (2000) concur with Crooks and add that students need explicit instruction in how and when to apply their newly acquired conceptual understandings.

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Self assessment is also an important component of metacognition. According to Bransford, Brown, and Cocking (2000), teachers should develop a culture of inquiry among learners and strategically integrate the teaching of self assessment and metacognitive strategies within subject-matter instruction. Such efforts help students learn to assess their own performance and monitor their understandings and progress, which, in turn, increase students' abilities to consciously regulate their use of these strategies. This also results in an increase in students' efforts to obtain and apply feedback, and such help-seeking actions are associated with increased motivation and persistence (Hilberg, Joshi, & House, 2009).

Convergent and divergent forms of formative assessment. The research on formative assessment makes a strong case for the strategic use of higher-level questioning, effective feedback, and student self or peer assessment. However, Pryor and Crossouard (2005) have recently begun to explore a dimension of formative assessment not found in the research cited above. They describe formative assessment practices as convergent or divergent: convergent practices assess *whether* a student is learning, and divergent practices assess *what* a student is learning. They contend that convergent formative assessment practices typically occur in the context of the well-known teacher-student IRF interaction pattern: teacher initiation (I), student response (R), followed by some kind of teacher follow-up (F), by the teacher asking a question or assigning a task for which there is a clear idea of a correct response, followed by feedback on how the learner's response matches the correct one. Divergent formative assessment practices occur in the context of dialogic interactions that are more

conversational in nature than the common IRF interaction pattern, and in which questions are asked for which there may be no previously known correct response. They characterize divergent questions as more often having the goal of helping rather than evaluating. Teacher follow-up to student responses, or feedback, is more exploratory or generative, often prompting for more engagement and greater detailed explanations of the learner's reasoning, and with diminished attention to student mistakes. Nystrand, Gamoran, Kachur and Prendergast (1997) contend that learning to think relies on active engagement in effective interactions much like those described by Pryor and Crossouard (2005) as divergent formative assessment practices, and that these interactions are closely associated with student learning. Wells agrees and suggests that "opportunities for learning and knowing are crucially dependent on the nature of the activities in which students engage and on the functions that language performs in these activities" (2001b, p. 12). Sociocultural theorists have held that there are two basic functions of discourse: a monologic function, which is to convey meaning, and a dialogic function which is to create meaning (Bakhtin, 1986; Gutiérrez, 1993; Nystrand, Gamoran, Kachur, & Prendergast, 1997; Wells, 2007; Wertsch & Toma, 1995). These functions are consistent with the constructs of convergent and divergent formative assessment practices described by Pryor and Crossouard (2005).

The research on formative assessment served as the basis for the development of the initial set of items for the FAIR. Additional items related to research-based effective instruction for English Learners and various site initiatives were added with

the collaboration of the district's English Learner Program Advisory Committee and district principals. The goal for developing the FAIR was to create a reliable tool that would serve the district's efforts to increase teachers' use of formative assessment strategies and of additional strategies drawn from research on effective instruction for English learners. The premise of this work was that increasing teachers' use of research-based instructional strategies would increase students' opportunities to learn and then result in greater equity in achievement.

Method

Participants

Observations were conducted in the classrooms of 17 teachers from an elementary school in Northern California with 404 students: 51.0% Hispanic/Latino, 8.2% African American/Black, 16.2% Asian, 13.4% White, 9.5% Filipino, 63% socioeconomically disadvantaged, and 42% English learners. At the time of this study, the school had an Academic Performance Index of 771 out of 1000 with 800 being the target on the state accountability system, and a federal accountability AYP percent proficient in Language Arts of 42.8% and mathematics of 58.2%.

Measures

FAIR. The items in the FAIR were drawn from two sources: formative assessment research and district and site initiatives related to increasing equity in achievement with a focus on English learners. Therefore, FAIR items are presented here in two categories: formative assessment strategies and what is termed here as

equity strategies. Formative assessment items were derived from the research cited above on formative assessment and include:

- Self or peer assessment using rubrics, checklists, answer keys, or guides
- Goal setting and progress monitoring
- Feedback during individual or group work: Teacher observes and monitors students at work
- Feedback during individual or group work: Teacher examines student work
- Feedback during individual or group work: Students receive feedback on the quality or accuracy of their work
- Feedback during individual or group work: Students incorporate feedback
- Feedback during whole class work or discussion: Teacher oral feedback during class discussion or whole-class instruction
- Questioning: Elicitation of relevant prior knowledge or personal experience
- Questioning: Asking of higher-order questions
- Questioning: Guiding reflection and metacognition
- Standards in student-friendly language are posted
- Students articulate a clearly-defined learning objective
- Mastery learning: Multiple attempts available to achieve mastery criteria
- Rubrics or anchor student work

A second set of items was developed in collaboration with the district's English Learner Program Advisory (ELPA) and site principals, drawing primarily from a summary of Claude Goldenberg's (2008) research synthesis of English learner

programs. Twenty-six percent of the district's students were English learners, and though the district had less than 1% newcomers to the United States, nearly 5% of the students were long-term ELs, defined as English learners enrolled in U.S. schools five years or longer. Increasing support for English learners was identified as a key goal in moving the district toward greater equity in achievement. Also included were strategies drawn from various site-based initiatives such as Marzano's work (2001) and Guided Language Acquisition Design (GLAD; Project G.L.A.D., 2011), an instructional approach for language acquisition by English learners. These items were deemed as supporting the district's focus on equity and include:

- Active student engagement beyond listening and watching
- Interaction strategies
- Students communicate in complete sentences
- Student self direction or choice
- Students ask questions when they don't understand
- Each student talks 50% of time (pairs or small groups, not whole class, choral, or chant)
- Consistent, predictable routines
- Oral language development through structured student responses
- Small-group instructional conversations
- Repeated presentation of key information
- Physical gestures, modeling, or visual supports used to make content comprehensible

- Graphic organizers
- Inquiry
- Teaching or modeling thinking processes or comprehension monitoring
- Letters, difficult words, or text passages are highlighted, previewed, or discussed
- Writing is edited and discussed
- Classroom climate is positive and characterized by respect for students' backgrounds, support, hard work, challenge, equity, and fairness

These items were grouped and arranged into a format for use by administrators and teachers to use for observing classroom instruction (see Appendix G).

Procedures

In the spring of 2010, as part of the development of the FAIR, the district's eleven principals and district office administrators partnered to conduct classroom observations in four or more classrooms at each school site to pilot use of the FAIR and to record observed occurrences of FAIR strategy use. After each observation, principals compared their records to begin to develop shared understandings of FAIR items and to calibrate their ratings. Subsequently, feedback and questions were elicited from principals and the FAIR was modified to increase item clarity by either rewording items or by providing examples or counterexamples. This effort to pilot the FAIR occurred prior to beginning the observations used to estimate the inter-rater reliability of the FAIR.

After the first 34 formal observations, two items were added to the FAIR: goal setting and progress monitoring, and student self-direction or choice. The first 34 observations are referred to as Round 1, and the latter 24 observations are referred to as Round 2. All FAIR items are categorical and indicate an observed use of the strategy with the single exception of *student engagement*, which is recorded on a scale of 1 to 5 to indicate the percentage of students actively engaged in learning beyond listening or watching.

Data collection consisted of 58 15-minute observations conducted by a pair of observers over a six-month period. After each observation, the observers compared individual ratings and generated a reconciled rating. Though observations were unannounced, they occurred with sufficient frequency that teachers were accustomed to them. On entering the classroom, the observers typically sat in the back or side of the room without introduction. When deemed unobtrusive, observers would circulate and interact with students.

Use of FAIR data. The following school year the FAIR was used district-wide in classrooms from kindergarten to grade 10 in three different timeframes, or windows, to conduct classroom observations and to obtain district-wide “snapshots” of FAIR strategy use. These observations were then summarized to provide a percentage of observations in which FAIR strategies were observed. The data collected in these observation windows were referred to as “snapshots” (see Appendix H) and were presented to principals; these data served as the basis for conversations, planning, and goal setting on FAIR strategy use across the district. At

one school site, the principal used the FAIR to conduct a great number of classroom observations and presented summary data on FAIR strategy use to her staff (see Appendix I). At the district level, these data served as a springboard for conversations about the relationships between strategy use and providing equity in opportunity to learn. The district-wide data were likely less reliable than the site data due to the very limited opportunities for developing shared understandings among principals; however, the data from the site observations were collected after numerous opportunities for the partners to calibrate understandings and ratings. These data were used for the analysis of inter-rater reliability.

Results

FAIR items are categorical, with the exception of *active student engagement*, which is rated on a scale of 1 to 5. Cohen's Kappa (Cohen, 1960; Stemler, 2004), a measure of inter-rater agreement for categorical data considered a conservative measure that corrects for the amount of agreement that is expected to occur due to chance, was used to estimate inter-rater reliability of categorical items. Landis and Koch (1977) consider kappa values greater than .6 to be strong. Spearman's rank order coefficient (Glass & Hopkins, 1996), a pair-wise measure of association between raters using ordinal scales, was used to estimate inter-rater reliability for active student engagement. Both Cohen's Kappa and Spearman's rank order coefficient are non-parametric measures, with Kappa measuring agreement of and Spearman's measuring association between categorical and rank variables, respectively. The ratings made over the 58 observations exhibited strong inter-rater

agreement, with Cohen's Kappa on Round 1, the first 34 observations of .74, and .78 on Round 2, the second set of 24 observations after the two additional items were added. Individual item coefficients ranged from .44 to 1.00 and averaged .70 (see Table 1). Spearman's rank-order coefficient for active student engagement with ratings from 1 to 5 was .85 on Round 1 and .88 on Round 2. Table 1 also reports the agreement between each rater and the reconciled ratings.

Table 1

FAIR Inter-Rater Reliability

FAIR Items	Cohen's Kappa ^{3,4}	Round 1 ⁷ Kappa	Round 2 Kappa	Rater 1	Rater 2
Formative Assessment Items					
Ss ¹ assess their work (or a peer's) using rubrics, checklists, answer keys, or guides	.62	.64	.60	.80	.84
Ss set goals and monitor their progress	1.00	NA	1.00	1.00	1.00
Feedback During Group or Individual Work Items					
T ² observes and monitors students at work	.79	.76	.83	.79	1.00
T examines student work	.68	.55	.83	.76	.93
Ss receive feedback on quality or accuracy of work	.78	.66	.92	.82	.96
Ss incorporate feedback to improve their work or understandings	.77	.61	.92	.88	.89
Feedback during whole class or whole group work	.69	.78	.56	.87	.82
Questioning Items					
Elicit relevant prior knowledge or experience	.67	.68	.65	.75	.92
Ask higher-order questions	.72	.71	.74	.90	.83
Guide reflection on understandings, performance, process, or strategy use	.71	.62	.78	.87	.84
Standards in student friendly language are posted	.60	.80	.33	.69	.90
Ss articulate learning objectives	.45	.31	.52	.62	.87
Mastery learning	NaN	NaN	NaN	NaN	NaN
Rubrics or anchor student work posted and referenced	.79	.65	1.00	.79	1.00
Equity: Interaction/Engagement Items					
Ss are actively engaged	.85/.71 ⁶	.85/.69	.88/.75	.97/.95	.89/.79
Oral language development through structured student responses	.84	.64	1.0	.84	1.00
Ss communicate in complete sentences	.61	.79	.47	.81	.81
*S self-direction or choice	.63	NA	.63	1.00	.63
Interactive strategies	.83	.76	.92	.86	.97
Inquiry (Ss' questions drive instruction and guide their learning; e.g., KWL, generating and testing hypotheses)	1.00	1.00	NaN ⁵	1.00	1.00
Each S talks 50% of time	.67	.62	.68	.76	.90
Ss ask questions when they don't understand	.55	.57	.50	.75	.86
Consistent, predictable routines	.79	.84	.75	.92	.86
Small-Group <i>Instructional Conversations</i>	.79	.79	NaN	1.00	.79

Repeated presentation of key information using visual cues, pictures, realia or physical gestures	.44	.40	.50	.69	.80
Physical gestures, modeling, or visual supports (e.g., projector) are used to make content comprehensible	.78	.78	.75	.89	.89
Graphic organizers	.77	.69	.88	.96	.81
Thinking processes or comprehension monitoring are taught or modeled (e.g. <i>Think Alouds</i>)	.63	.72	.46	.7	.90
Comprehension	.86	NaN	.81	.86	1.00
Letters, difficult words or text passages are highlighted, previewed, or discussed	.47	.41	.51	.69	.79
Writing is edited and discussed	.77	.84	.70	.77	1.00
Equity: Classroom Environment Item					
Classroom climate is positive and characterized by respect for students' backgrounds, support, hard work, challenge, collaboration, equity, and fairness	.74	.79	.70	.92	.84
Overall	.76	.74	.78	.88	.91

Note. ¹Ss = Students; ²T = Teacher; ³N = 58 for all items other than two items marked by * for which N = 24. ⁴For all items $p < .001$. ⁵Item not observed therefore Cohen's Kappa does not return a coefficient. ⁶Item is rank order and Spearman's rank order coefficient and Kendall's W are reported. ⁷Round 1 consists of the first 34 observations; Round 2 consists of the latter 24 observations after the final two items were added to the measure.

All FAIR items exhibited strong inter-rater agreement with three exceptions: *students articulate learning objectives; repeated presentation of key information using visuals; and difficult text is highlighted, previewed, and discussed*. It should be noted that coefficients for each of these items increased in the second round of observations to greater than .5, which represents a moderate level of agreement.

Discussion

This paper presented the development and inter-rater reliability of the Formative Assessment and Interaction Record (FAIR), a measure for documenting teacher use of research-based instructional strategies. The items contained in the FAIR are grouped into two categories: formative assessment and equity. The equity items were drawn primarily from the research on effective instruction for English

learners, and also from a variety of site initiatives including Marzano's strategies and strategies from the Guided Language Acquisition Design instructional model. The goal of this research was to develop a tool that could serve not only as a reliable measure of teacher strategy use, but also serve to support the district in its efforts to increase equity in student achievement between the district's different ethnic and language student groups. The premise of this work was that increasing teachers' use of research-based instructional strategies would increase students' opportunities to learn and then result in greater equity in achievement.

This paper discussed formative assessment from a sociocultural perspective with the intention of providing a possible rationale for the positive results stemming from use of formative assessment. From a sociocultural perspective, formative assessment can be characterized as responsive assistance in individual learners' zones of proximal development with the goal of assisting learners to accomplish with assistance what they could not accomplish independently.

The study presented here demonstrates a high level of agreement between observers using the FAIR, averaging .70, in documenting teacher use of FAIR strategies. However, possibly a far greater value of the FAIR is its usefulness as a semiotic tool used in conversations between administrators, principals, and teachers focused on the use of research-based instruction to increase students' opportunities to learn, issues of equity in the classroom, and about teaching practices and their relationships to learning as well as opportunity to learn.

District administrators, in collaboration with district managers, used the FAIR to establish goals for teachers' strategy use and to document subsequent changes over three time periods. Sites used the FAIR similarly. Title I elementary schools arranged for teachers to visit one another's classrooms and used the FAIR to focus their observations, discussions, and reflections. The FAIR was central to the work of one principal who led teachers to identify strategies that they would collaboratively develop, then provided release time for teachers to observe classrooms to learn from one another and to reflect on the connections between strategy use, equity, and opportunities to learn. At this site, the principal frequently visited classrooms and used the FAIR to provide individual and group feedback to teachers.

There are qualitative indications, in addition to the inter-rater agreement data on FAIR strategy use, that the FAIR is supporting district and school reform efforts. At one site, early in the year the principal observed teachers engage students in interactive strategies in 44% of the classrooms visited. Later in the year, interactive strategies were observed in 57% of the classrooms visited (see Appendix I). Another principal commented that her staff selected three FAIR strategies to develop in the coming year, which were then included in their School Plan for Student Improvement. This allowed her entrée and a purpose to be in teachers' classrooms. Her observations led to feedback, shared discussions, and observable changes in classrooms. She said that, "having that tool, that walkthrough, and having it be part of our plan, made a big difference...it made me a better principal." At a site presentation to the School Board, a teacher from a third site shared her experiences with the FAIR:

One of the reasons our walkthrough document is so useful is because it is full of best practice strategies and suggestions, all written in user-friendly terms, so as teachers, we know what these good teaching strategies look like...each grade level was asked to focus on one teaching strategy that we felt was vital to the development of our students. Our first grade team focused on oral language development through structured student responses... this key statement is posted next to my plan book to make sure that I'm incorporating this best practice throughout the day. I've also written down these key metacognitive questions [What strategy did you use? What would help you next time? Does this make sense? Why? Have we done something similar?] noted on the walkthrough form as well so that I can be sure to use these questions as I teach my students. They know that I'm going to ask them to talk through how they solved their problems, or to name that strategy that they used. I love how teacher and student-friendly this walkthrough document is. Incorporating these key concepts into each lesson guarantees that students will learn to think and think to learn.

The FAIR is itself a formative assessment tool in that it assisted the district to implement several formative assessment strategies in the district's professional development work with teachers by providing: "friendly" learning targets for teachers; principals and teachers with the means to offer feedback; teachers with opportunities to incorporate the feedback to improve their performance; and finally, it offered teachers a tool with which to reflect on how their teaching supported learning in the classroom. One principal stated:

I want to have a way to kind of get them some feedback on what I am seeing with their instructions and a point to reflect. Even if all the boxes aren't checked on the walkthrough, that's not the main concern. A bigger concern is, when you get this, [are] you reading through and thinking, 'well, is there a way that I could have restructured this lesson [so] that that box actually could have been checked, or maybe not, because some lessons might not lend themselves to that?' But, it's that process of could... if I did it differently, is there a way that I could've put this in there? To me, that's really pretty powerful, to be having that dialogue. But, maybe without that tool you might not have thought about it.

Tharp and Gallimore (1988) emphasize the value of collaboration on a shared product in developing intersubjectivity, which is shared meanings, values, and emotions among participants. Similarly, Wells (2001) asserts that collaborative knowledge building and the development of new understandings are supported by a shared focus on the development of an improvable object. The development of such an object requires participants to debate, argue, justify positions, and negotiate the problems that are inevitably encountered. In this district, the FAIR served as such an improvable object. Items for consideration had to be initially offered, considered, debated, justified, and ultimately accepted or rejected. Working together to calibrate ratings made in classroom observations led to disagreements, debates, and ultimately to greater shared understandings. In the analysis of FAIR data and the generation of focus strategies and specific performance goals, teachers and principals together explored the relationships between FAIR strategy use, student learning, and the district's goals around equity in achievement. The role of the FAIR in supporting focused dialogue is explored more in the next study on principals' formative use of data.

Tharp and Gallimore (1988) contend that achieving equity in the classroom will require that teachers instruct in such a way that they can consistently, equitably, and responsively assist students to deepen their understandings to a greater degree. They define responsive assistance as first assessing what learners know, understand, or are able to do, and then providing the assistance necessary to deepen learners' understandings. This is precisely how Black and Wiliam (1998a) define formative

assessment. Such interactions provide students with equal access to the most valuable resource in the classroom—the teacher—and equal opportunities to acquire the knowledge, skills, strategies, tools and understandings of more expert others. They also encourage greater equity in the distribution of assistance.

Tharp and Gallimore (1988) have also maintained that education reform must focus on improving teaching. However, the classroom environment necessary to reform education is fundamentally different from what most teachers experienced as students. For teachers to be successful in taking on new roles and changing practices that have not been achieved despite decades of reform efforts, they will need a clear articulation of the targeted changes. The FAIR provides such an articulation.

According to Putnam and Borko (2000), teachers' interactions with colleagues are primary determinants of what is learned and how it is learned. Discourse among educators provides such cognitive tools as language, ways of interacting, ideas, theories, and concepts. For teachers to be successful in taking on new roles and changing their practices, they also need opportunities to participate "in a professional community that discusses new teacher materials and strategies and that supports the risk taking and struggle entailed in transforming practice" (McLaughlin & Talbert, 1993, p. 15, as cited in Putnam & Borko, 2000). It is hoped that the FAIR served and will continue to serve as a useful tool in this discourse, as well as to guide and reliably document changes in practice.

Chapter 3

Using Formative Assessment in the Cycle of Inquiry:

Principals as Leaders of Collaborative Dialogue and Reflection

In August of 2010, the California State Board of Education adopted the Common Core Standards as the new English Language Arts, mathematics, social studies, and science standards for California schools. The new language arts standards are organized around college and career readiness standards for reading, writing, speaking, listening, and language; the new mathematics standards are structured around building deep understandings and abilities to apply mathematics to novel problem solving situations. The shifts represented in these standards are proclaimed by some as new standards for the 21st Century (cf. Partnership for 21st Century Skills, 2011); others, however, maintain that the educational foci implied by the Common Core—problem solving, written and oral communication, creativity and innovation, critical thinking, and collaboration—have been well articulated and promoted since the early 20th Century by progressive educators such as John Dewey (1916) and William Heard Kilpatrick (1951), and in recent decades by scholars of education reform and change processes such as Linda Darling-Hammond (2010), Andy Hargreaves (2009), and Michael Fullan (1993). The success of the Common Core Standards in raising student achievement will rely on the ability of states, districts, schools, and classrooms to effect significant broad scale change, which has thus far eluded education in the United States. The U.S. Department of Education asserts that research supports the position that effective teachers are the most

important factor in raising student achievement, and that therefore more opportunities for frequent, effective professional development are necessary to achieve our current, broad scale, educational goals (2007). This qualitative study examined collaboration between elementary school site and district leaders to engage teachers in inquiry and analysis of student assessment results and teacher performance data with a focus on formative assessment practices and their relationship to equity and opportunity to learn.

Key proponents of school reform and change point to a number of plans, strategies, and policies for teacher professional development. For example, Darling-Hammond (2010) calls for a long-term professional development focus on and commitment to equity in the context of inquiry and project-based learning, Hargreaves (2009) espouses professional development focused on deepened, demanding, and engaging instruction, and Fullan (2011) contends that strong understandings of both the change process and teaching and learning are necessary for lasting change. Adult learning theory points to professional development that is job-embedded, builds capacity, is situated in the daily lives of teachers, and involves teachers in reflection and collaboration (Knowles, 1975, 1984). According to Knowles, adult learners value: self-direction in planning and evaluating their own learning; learning from experience; learning that is immediately applicable to their work or personal lives; and an inquiry approach to learning that is problem centered rather than topic centered. Wells (2009) extends these principles and suggests a useful conception for professional development as collaborative inquiry that focuses on

increased opportunities for shared thinking and active engagement in problem solving both between professional developers and teachers and between teachers and students.

In support of Wells' assertion, Gallimore, Ermeling, Saunders, and Goldenberg found that a model of professional development through teacher inquiry resulted in gains in student achievement (2009). Further support is provided by an extensive review of research on professional development by the Stanford School Redesign Network (Darling-Hammond, Wei, A., Richardson, & Orphanos, 2009), which concluded that professional development through teacher inquiry is effective when groups of teachers analyze and discuss student-performance data to identify common errors and misunderstandings, develop shared understandings of student learning and development, and engage in collaborative inquiry to learn what instructional strategies work to help students master concepts and which do not, and for whom they are effective. There are numerous models for teacher inquiry; all follow to some extent the scientific method of observation, measurement, experimentation, and the formulation and testing of hypotheses. One such inquiry model in education is termed a Cycle of Inquiry (Wellman, 2004), and describes a three-phase collaborative process focused on increasing student learning: first, teacher teams generate predictions or hypotheses based on personal experience; second, data are analyzed to identify patterns or trends and to generate possible causal explanations; and third, new hypotheses and action plans to test them are collaboratively created. Subsequently, action plans are carried out, new data are

collected, and the teams of teachers continue the cycle. Gallimore and colleagues (2009) also describe a three-phase model of collaborative teacher inquiry: identification of student needs, formulation of instructional plans, and use of evidence to refine instruction. The administrators that participated in the study presented in this chapter spent a number of years studying Wellman's Cycle of Inquiry and used it generally as the basis for their professional development work with teachers.

If change depends on developing highly effective teachers, and achieving that goal requires effective professional development, the question remains: How can the field of education support this effort? Starcher (2006) contends that school principals are the necessary drivers of this change. Fullan (2002) asserts that, though leadership and sustainability are the foundations for large-scale change, the conception of the school principal as an instruction leader is insufficient to sustain improvements; rather, the role of the principal must expand to become a leader of change and continuous improvement, and a successful principal will need to be able to balance s with building relationship, participate actively in inquiry with their staff as a co-learner, maintain a focus on learning and instruction, create a culture of job-embedded learning, and possess a strong knowledge of and critical eye toward research.

While the value of assessment in increasing achievement is well documented (Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Natriello, 1987; Shute, 2008), the role and value of formative assessment is beginning to take center stage. Formative assessment takes many forms, from frequent tests or quizzes to

informal teacher-student interactions, and its functions to inform the teaching and learning process during instruction. The essential factor that determines whether an action is formative is whether feedback is used by teachers or students to inform teaching and learning. Black & Wiliam (1998) describe formative assessment as a two-part process in which learners—teachers or students—first assess the gap between what they know or are able to do and the learning goal, and then take action to close that gap to attain the learning goal. It is important to note that some forms of assessment can serve both summative and formative functions. For example, a summative test becomes formative when it is used by teachers to respond instructionally, by students to redirect their learning efforts, or by schools or districts to identify areas of need.

The study presented here examined collaboration between school site principals and district leaders to increase teachers' use of formative assessment practices and to engage teachers in the formative use of assessment data. All principals worked in the same school district, which served a diverse student population with 49.0% Hispanic/Latino students, 6.9% African American/Black, 12.4% Asian, 17.7% White, 8.7% Filipino, 2.7% American Indian, Alaska Native, or Pacific Islander, 2.5% two or more races, 49.4% socioeconomically disadvantaged, and 38.1% English Learners. The goals of this collaboration were twofold: first, to increase teachers' use of formative assessment practices, and second, to leverage assessment data formatively to increase teachers' understanding of individual student learning needs and to inform instruction. Thus, formative data were the basis for both

goals: data on teacher practices using the Formative Assessment and Interaction Record (FAIR; Hilberg, 2012) were used formatively by teachers, schools, and the district to increase teachers' use of formative assessment practices, and assessment data were used to increase student learning.

The FAIR is a classroom observation protocol used by both principals and teachers to record classroom use of formative assessment and other focus strategies of the district. The FAIR was developed collaboratively by district and site leaders, and contains items related to two constructs: formative assessment and equity. Formative assessment items were derived from research on formative assessment and include self and peer assessment, rubrics, clearly communicated learning objectives, goal setting, progress monitoring, and feedback. A second set of items was drawn from Claude Goldenberg's (2008) research summary on effective instruction for English learners, as well as from site initiatives focused on Marzano's work (2001) and Guided Language Acquisition Design (Project G.L.A.D., 2011). These items were chosen to support the district's focus on better serving English learners as part of its work on equity, and they include *active student engagement*, *interaction strategies*, *student self-direction*, among other research-based strategies (see Appendix G).

The premise of this work was that increasing teachers' use of formative assessment and equity strategies, and engaging teachers in collaborative analysis of student assessment data, would result in increased student achievement and together these would move the district toward its overarching goal of increasing equity in achievement among student ethnic, income, and language groups. The district's

definition of equity came from the National Equity Project (Osta & Perrow, 2008): Ensuring equally high outcomes for all participants; removing the predictability of success or failure that correlates with any social or cultural factor; and interrupting inequitable practices, eliminating biases, and creating inclusive, multicultural school environments.

In this qualitative study, six elementary principals were interviewed to examine how they used teacher performance data to facilitate changes in teaching practice, how they used student assessment data to engage teachers in data-based collaborative inquiry focused on student learning, and to explore their perceptions of how this work related to their achievement and equity goals.

Project Background

In 2007, at the time of the work reported here, I served as the assessment coordinator for a suburban K-12 unified school district of 7142 students in Northern California. Two principals of Title I elementary schools advocated for a data management system that would allow principals and teachers to better understand student learning and student performance on state assessments: what students know and can do, where they need help, and whether new instruction, new district or site initiatives (e.g. tutoring programs, math software, new curriculum, regrouping students for differentiated instruction, etc.), or specific interventions were successful. The principals also expressed a need for the ability to monitor achievement gaps between different ethnic, language, and socioeconomic groups of students. They were mystified by the district's low rates of success on state assessments and thought that

one cause might be a misalignment between local curricula, state standards, and the California State Assessments including the California Standards Tests (CSTs) and the California High School Exit Exam (CAHSEE). The tests were taken in the spring, and the results arrived, in August. Principals were often perplexed by the resulting gains or losses and perceived them as random and unrelated to district and site improvement initiatives. The principals expressed the need for a local assessment system that would help them better understand their state assessment results, identify individual students' learning needs, and monitor student progress toward mastery of state standards. They were primarily concerned that students learned what would most support them in their future educational and career endeavors, not student test results, but they also were aware of the detrimental consequences of poor test performance. They did not perceive the state assessments as necessarily the sole or even primary determinant of what students learned. State assessments are merely multiple-choice measures of a limited range of knowledge and abilities. Principals did perceive them, however, as high stakes assessments potentially resulting in severe state and federally imposed sanctions.

An Assessment Advisory Committee was formed, comprised of district managers and elementary level teachers and principals. A yearlong analysis of district needs ensued, and district priorities for a data management system were delineated. Nearby districts were surveyed and vendors were solicited to determine the degree to which their products could meet the identified district needs. A final set of vendors was asked to present their products to the committee, which led to the selection and

purchase of an online assessment and reporting system (OARS). The following academic year, 2008-2009, principals from the district's sites attended a day-long training on the use of the system; elementary teachers attended a two-hour training.

A collaboration among district and site leaders ensued to develop meaningful ways to use this new tool to work toward district achievement and equity goals. In the first year of implementation, three common, standards-based, grade-level assessments were developed and administered in English Language Arts and Mathematics in kindergarten through grade six, and in the following year several sites also administered three additional assessments aligned to site-specific target standards. OARS allowed the creation of grade-level assessments aligned to state content standards, and provided immediate reports to teachers with amazing detail on student strengths and needs, item analyses, and distracter-analysis reports with information on likely student misconceptions. OARS also allowed teachers to use assessment data to form specific need-based intervention groups to help them plan for differentiating instruction. OARS also allowed district and site leaders to monitor schools, grade levels, individual classrooms, and individual students. The collaboration between principals and district-level managers revolved largely around the development of protocols to engage teachers in data-based collaborative inquiry focused on student learning.

Interrelatedly, there were district efforts to increase teachers' use of research-based instructional strategies. There were two driving forces for this work: first, the district had recently been identified for program improvement due to English

learners' performance on state assessments in English language arts, and the district was charged with improving the quality of instruction for this group of students; second, teachers needed to develop a repertoire of strategies and skills to effectively respond to the student learning needs identified by the new assessment system. District leaders developed a teaching performance walkthrough tool, the Formative Assessment and Interaction Record (Hilberg, 2012), with the hope of both increasing teachers' use of identified strategies as well as providing reliable data documenting teacher practice and changes in their practice at the classroom, school, and district levels.

Method

Participants

Participants were six elementary principals. All participants were female, ages ranged from 33 to 60 ($M = 46.3$, $SD = 10.3$), four were White, one African American, and one biracial White and Filipino. Principals' years in school administration ranged from 5 to 11 ($M = 7.7$, $SD = 2.4$). Participants were not compensated for their participation. Table 2 provides the ethnic, socioeconomic, English proficiency, and disability demographics of the represented schools. The schools with the fewest English learners and socioeconomically disadvantaged students, Barlow and King, are the district's highest performing schools, as indicated by the State Academic Performance Index (API), which is based on the state assessments, and the school with the greatest number of English learners and socioeconomically disadvantaged students, Summit, is the lowest performing elementary site.

Table 2

School Demographics: Ethnicity, Socioeconomic Status, English Proficiency and Disability

	Site 1:	Site 2:	Site 3:	Site 4:	Site 5:	Site 6:
	Barlow	King	Lakeside	Mission	Muir	Summit
Hispanic or Latino	25.4%	33.4%	55.0%	54.2%	64.7%	69.3%
American Indian or Alaska Native	0.5%	0.8%	0.5%	0.3%	0.3%	0.2%
Asian	28.8%	12.0%	7.6%	16.4%	7.9%	6.8%
Pacific Islander	0.9%	2.9%	2.4%	1.0%	3.9%	2.6%
Filipino	9.1%	6.8%	5.8%	9.1%	8.5%	6.3%
African American	11.1%	6.3%	4.2%	7.8%	3.9%	6.8%
White	23.2%	35.8%	18.7%	9.1%	7.6%	7.6%
2 or More Races	1.1%	2.1%	5.5%	2.1%	3.0%	0.4%
English Learners	29.5%	25.1%	41.6%	56.5%	54.7%	70.6%
Disability	5.2%	8.4%	7.9%	8.3%	11.5%	9.1%
Socioeconomically Disadvantaged	29.3%	19.8%	51.6%	66.9%	65.6%	78.2%
Number of Students	560	383	380	384	331	541
API	843	794	798	771	756	717

Research Design and Procedures

Six principals participated in interviews that occurred in June 2011 using a semi-structured protocol (see Appendix J). All interviews were videotaped and were conducted either in the district office or in principals' offices at their school sites. Interviews ranged from 45 to 65 minutes in length.

Data consisted of verbatim transcripts of the interviews. The six transcripts ranged from 13 to 19 single-spaced pages in length. A constant comparative data analytic approach, for which repeated comparisons were made between the developing coding structure and ongoing analyses, was employed to develop understandings of emergent trends or themes (Stake, 1994; Strauss & Corbin, 1994; Thorne, 2000). The initial coding structure was created based on the topics addressed in the interview questions, including principals' perceptions of (a) how they used FAIR data to facilitate changes in teaching practice, (b) how they used data to engage teachers in cycles of data-based collaborative inquiry focused on student learning, and (c) how this work related to their goal of increasing student achievement and increasing equity among different ethnic, language, and socioeconomic student groups. Additional codes were added throughout analyses to explore emerging topics and themes.

Results

Principals' use of FAIR data to increase teachers' use of formative assessment practices. In addition to ongoing analysis of student assessment data, principals also regularly collected and discussed teacher performance data. They used a measure created collaboratively by district managers within the district: The Formative Assessment and Interaction Record (FAIR; see Appendix G). The FAIR was initially developed as part of the district's response to federal sanctions related to low performance levels of English learners on the state English Language Arts assessments. The district was asked to make a concerted effort to increase teachers' use of research-based instructional strategies that support English learners throughout the district and across content areas. The FAIR allowed the district to capture "snapshots" of teaching practices across the district, and also to monitor whether the district's various initiatives resulted in any changes in practice.

The strategies in the FAIR come primarily from two areas of research: instruction for English learners and formative assessment. Research on formative assessment has demonstrated the effectiveness of several classroom strategies or practices for improving achievement, including: (a) clearly communicating learning targets prior to instruction, (b) providing timely feedback with opportunities for students to incorporate the feedback to improve performance, (c) engaging students in self and peer assessment, and (d) use of teacher questioning to elicit information on student understandings and to guide student thinking (Hilberg, 2012). The FAIR provides a record of teacher use of these formative assessment strategies, as well as

additional strategies associated with gains in achievement for English learners. The use of the FAIR itself is a formative assessment practice in that: (a) it clearly articulates the desired learning targets (the research-based instructional strategies) to teachers, (b) it allows principals to provide timely feedback on performance, and (c) it can be used by teachers for self and/or peer feedback. Several sites in this study systematically structured teacher visits to one another's classrooms, and subsequently used aggregated FAIR data to identify the strategies that were used consistently across the school as well as strategies that might benefit student learning if used more consistently or extensively. One principal stated that the FAIR is "a clear communication of what my expectations for instruction were," and that, "As much data as I collect on the student performance, I want to be collecting that much data on teacher performance and teacher actions...Because we know what the adults do impacts what the kids do." This principal also stated that the FAIR provided her with, "a starting point of where we are, and we can say, 'okay, if we were at this point in October, we want to be at this percentage point in November.' It gives us something to work towards." Principals stated that the FAIR also provided the basis for schools or grade-level teacher teams to generate specific goals related to strategy use, for which the principal could collect data through classroom observations to measure progress and for which they could provide teachers with specific feedback.

Analysis of principal interviews revealed several themes related to principals' formative use of FAIR data to foster changes in teaching practices: (a) principal feedback to teachers was instrumental in promoting changes in teachers' use of FAIR

formative assessment and equity strategies, (b) changes in teachers' practices resulted from reflection, collaboration, and dialogue among teachers inspired by FAIR data or feedback, and (c) peer observations using the FAIR promoted changes in teachers' use of FAIR strategies.

Change inspired by principal feedback to teachers. Principals used the FAIR in a variety of ways to provide individual and group feedback. For individual feedback, some principals gave teachers a copy of the FAIR with written, descriptive feedback, identifying the strategies used, and often citing specific instances when a particular strategy was observed (e.g. if "peer-assessment" was observed, a principal might record "math rubrics used for peer assessment" or if a particular questioning strategy was used, the principal might record the question). Identifying specific instances of strategy use was important in helping teachers make connections between their practice and specific FAIR strategies. Many principals also provided written descriptive feedback, typically first describing observed strategies that they perceived as especially effective in promoting learning, and then providing one or more suggestions, direct requests, or reflective questions for the teacher to consider.

One principal reported that her staff had developed a high degree of comfort with FAIR feedback so that she was able to leave written feedback in teachers' mailboxes, which often sparked communication between the principal and a teacher. The teacher might respond in person or in email saying, "I thought about this," or "I've been thinking about this; can you stop by on Tuesday and check it out?"

With the many events that occur in a typical school day that compete for teacher and principal time and attention, this principal viewed the FAIR as a tool that allowed her to seamlessly and quickly provide teachers with specific feedback on their use of the FAIR strategies. She said, “Maybe without that tool, you might not have thought about it, because there are so many other things that go on in a day.” She concluded, “I want to use [the FAIR] as a consistent way to kind of quickly give teachers feedback and a tool for them to reflect on.”

Another principal stated that her feedback varied from indirect feedback in the form of a reflective question to direct feedback in the form of a specific suggestion related to their use of the FAIR strategies. A third principal reported that she provided teachers at her site with a summary of the data she collected on all of her classroom observations using the FAIR, and then engaged teachers in a conversation about what the data implied about the school and for their students.

Many principals also provided group feedback after a round of walkthroughs. Principals stated that they perceived that such feedback was effective in two ways: first, it afforded broad communication of specific instances of strategy use, and, second, it was deemed by some principals as a more supportive or less intimidating way to communicate feedback. One principal described the process that occurred after conducting some classroom observations:

We'd come back to my office, we'd chart down some strengths that we saw, and we'd send an e-mail out to staff. ‘In a third grade classroom, I saw a teacher giving feedback and the students having an opportunity to incorporate it into their writing.’ So, we'd send that feedback...so that teachers could kind of get that shout out. And those practices usually spread throughout the school.

Another principal said that her preference was to provide group rather than individual feedback to teachers because she wanted teachers to develop collectively to better meet student needs, rather than individually.

Change in teaching practices facilitated by reflection, collaboration, and dialogue among teachers. Principals valued the FAIR as a tool that promoted collaboration and dialogue both between themselves and teachers, as well as among teachers. One principal commented that having the FAIR led teachers to constantly reflect on what changes they could make in their teaching practices that “could be the most powerful for our students” that “maybe without that tool you might not have thought about.” Another principal stated that using the FAIR with other administrators to conduct observations of classrooms as her site extended her thinking and understandings, largely due to the ensuing dialogue and debate about teaching and the effect that practices had on learning and opportunities to learn:

we would be looking, using the walkthrough, coming out, making some adjustments, kind of arguing over... really norming ourselves and arguing over what should kind of be included on the walkthrough. And that was some great dialogue that we were having. And in the midst of having that dialogue with her, I realized the most powerful... part of the experience was the conversation we had after we walked out of the classroom... That was the conversation I needed for my teachers to be having. Because we would literally sit there and debate over what active engagement looked like. And it was healthy, but, we were relentless; we were both kind of pushing each other.

Change through focused peer observations. Several sites coordinated teacher peer observations using the FAIR. One principal first arranged for the teachers on her leadership team to accompany her on classroom walkthroughs, after which they

would discuss their observations, identify school-wide strengths as well as areas they might target together for growth.

And they felt that it was such a powerful experience to get to be in classrooms. I think for them, initially, the tool, it wasn't so much about the tool, it was about the opportunity just to be in the classroom and see and learn from each other. And the tool was helpful because it gave us a common place to begin the dialogue.

The FAIR continued to play a key role in the ongoing dialogue about the development of instructional practices at this site. All teachers had regularly scheduled opportunities to use the FAIR to observe their colleagues' classrooms. The staff also selected strategies they wanted to develop as a group and for which they would use FAIR data to monitor the degree to which their efforts were successful. For example, early in the year this principal observed teachers engage students in interactive strategies in 44% of the classrooms visited and students engaged in self or peer assessment in 35% of the classrooms. Later in the year, interactive strategies were observed in 57% of the classrooms visited and student self or peer assessment in 43% of classrooms (see Appendix I for FAIR data documenting changes in use of FAIR strategies at this site).

At another site, the principal reported that teachers' use of the FAIR led to increased use of graphic organizers and rubrics for self and peer assessment. The principal reported that at the beginning of the year her observations did not reveal any evidence of rubric or graphic organizer use. She then reported back to teachers, "Well, if we pick something like rubrics, it can't be hit or miss... there needs to be some evidence it's part of your daily routine." The staff then agreed that they would

use staff meeting time for planning and developing graphic organizers and rubrics, and that they would visit one another's classrooms during non-instructional times to look for relevant evidence and artifacts. This principal reported that the teachers created rubrics for, "all kinds of different things... I think that having that tool, having the walkthrough...made a big difference."

Principals reported that they viewed the FAIR as a tool that they could use flexibly to leverage dialogue, reflection and change in teachers' use of the strategies identified in the FAIR. Principals planned and structured the use of the FAIR in meetings and in walkthroughs, they arranged and coordinated teacher observations of one another, they facilitated collaborative analyses using FAIR data, and structured conversations about the relationship between use of research-based strategies and student learning. One principal stated that the FAIR increased her effectiveness as a principal and provided her with a safe entrée into teachers' classrooms in a way that was perceived positively by her staff.

Formative use of assessment data to inform instruction. Principals reported that they perceived the district-wide rollout of an online assessment system as marking a key turning point in the ability of the district to engage teachers in focused inquiry using assessment results. The assessment system was valuable in that it provided teachers with much more than just test results. The system provided over 30,000 multiple-choice questions spanning kindergarten to grade 12, each item based on a specific state standard. Items were also designed to capture common student misconceptions by including distractor options. As soon as teachers uploaded their

results, they could access a number of reports including detailed information on each item, each student, or each standard. Additionally, teachers were provided with distractor analyses that listed which students chose which incorrect answer and what the possible misconceptions were that might have led the students to select that particular distractor, thus giving teachers insight into student thinking and student understandings (see Appendix K for a sample single item distractor report for grade 3). This allowed teachers to easily design targeted small-group instruction to meet individual and group learning needs. One principal described how this:

[OARS] was a catalyst in changing the data savviness of every instructional leader in our school because, with a click of a button, we could find out exactly down to the standard, and the concept of the standard, and the misconception of the standard, what the student was struggling with to allow teachers to not guess what the child needed.

Principals and district leaders collaborated to create a number of processes to facilitate administrator and teacher inquiry around the formative use of assessment data. The key products and processes developed included CST Worksheets, Focus Standards, Focus Students, and Inquiry Protocols.

CST Worksheets. Principals described receiving “CST Worksheets” from the district assessment office shortly after the state assessment results arrived in August each year. Results were provided for the district as well as for each school site (see Appendix L for a sample CST Worksheet). On the worksheets, the results for each grade level and content area test were disaggregated into strands (e.g. in mathematics there are five strands of questions: Number Sense, Algebra and Functions, etc.), or groups of related questions, and the percent correct within each strand was compared

to state averages and the minimum average percent correct needed to attain proficient and advanced levels of achievement. These worksheets also provided the number of items on the state assessments for each strand, which vary between grade levels and content areas. To facilitate analyses using the data provided on CST worksheets, principals provided teachers with two to four years' of worksheet data so that comparisons could be made across years.

Focus standards. Principals described the generation of “focus standards” as a product of their CST Worksheet analyses. Focus standards were monitored formatively throughout the year to allow teachers to monitor student progress toward mastery of a specific standard. Teams of same-grade teachers first selected a content strand (e.g. Number Sense in math or Reading Comprehension in Language Arts) on which they planned to focus their efforts in the coming year, and then examined the state-provided test blueprints that detail the specific content standards within each strand, as well as the number of items for each standard. Grade-level teams then selected one or more “focus standards” with the goal of improving student learning, deepening their own understanding of student development and learning, and developing their expertise in teaching the targeted standard.

Principals described the intention of focus standards: teachers were expected to introduce related concepts, vocabulary, and skills early in the school year and integrate them spirally into instruction throughout the year so that students would have multiple opportunities to deepen their understandings, rather than teaching these standards only as they appeared in the curriculum texts. However, principals reported

that this intention met with varying levels of success. Sites that reported the greatest success were those at which the principal regularly scheduled time at staff meetings for teachers to discuss students' progress, examine student data, and share strategies relevant to teaching focus standards. Other principals, however, reported that they felt that they did not provide sufficient follow-up to ensure the success of this initiative.

Comments from principals described these two outcomes:

There is a correlation between [keeping focus standards alive all year] and spending time in professional development around them all the year. We would do things like bring in artifacts that show what you are doing to focus on these focus standards. We would also, in staff meetings, look at the results of those focus standards' quizzes. And so there is a high [level of] accountability when you are looking at assessments for your students with your grade-level teams ... But I think carving out the time to analyze the data and to analyze and share best practices with colleagues is a critical point in making those focus standards become a priority...

In contrast, a principal from another site stated:

I took them through that process...but I think I need to help them figure out then how to keep those focal standards at the forefront of their teaching. I think it gets lost for them, and then, 'uh-oh, it's quiz time.'

The success of focus standards as a useful construct to better understand, monitor, and increase student achievement on local assessments depended on the systematic support of the site principal. Such support might be thought of as a low-stakes system of accountability, created with the intention of supporting an initiative, rather than as a high-stakes accountability system created to enforce or monitor implementation with fidelity. A principal commented:

Any time you can have an accountability measure, I think it does help. Not in a threatening sort of way. You know, it's not me coming in and saying, 'you're doing a bad job.' It's, 'all of our kids aren't achieving where we want

them to achieve, so let's put something in place and make it better.' So then they're not worried about looking at data.

Principals reported that identifying focus standards was a district expectation, determined collaboratively by principals and district office administrators, and that grade-level teams use the online standards-based item bank to create three "focus standards quizzes" to be administered throughout the year to monitor student progress toward mastery of site-specific focus standards. Sites followed different progressions toward meeting this expectation: at one extreme, some sites immediately added focus standards quizzes to their site assessment calendars; at the other extreme was a principal who dismissed the entire effort; in the middle were sites that chose to administer one or two quizzes rather than three in their first year. Factors that contributed to the varying progressions included changes in site or district leadership, varying levels of technological experience and comfort levels by principals or teachers, and other site initiatives that competed with this work for principals' and/or teachers' time.

Focus students. Several sites also introduced the concept of "focus students" as part of their inquiry work. Focus students were selected primarily from traditionally underserved groups (e.g. lower-achieving students, English learners, students with disabilities, African American students, or Hispanic/Latino students, most often selected because they had multiple risk-factors), and were identified to serve as case studies for teachers as they learned how to better meet individual student learning needs. The intention was that new understandings developed by

working with focus students would become resources for teachers to use to help additional students. One principal described this work at her site:

It's not that those focus students get more... but they become almost a mini representation, a microcosm of the classroom... then everybody in the classroom will benefit from the improved instructional practice of the teacher and supplementary resources that they are bringing to reach that group of kids... We felt confident that by being able to reach that particular learner, we would be able to broaden our repertoire for all learners.

Another principal emphasized to teachers at her site that, if they selected focus students and determined how to help them be successful, then “you are going to automatically take a bunch of other kids with you because good teaching is good teaching.” This principal also reported that the work with focus students generated an increase in collaboration and generativity among teachers. Teachers would ask one another “who are your students and what are the techniques that you are going to use to move them forward? What are the assessments that you are going to use to assess if they've made that growth?”

Teachers at one site created monthly learning goals for each focus student, and developed a rubric for each goal, so that focus students understood where their current performance was in relation to the goal and what they needed to do to attain the goal, thus allowing students to track their own progress. Teachers then met weekly with individual focus students to discuss progress and to help them create individualized learning plans. This principal stated this empowered students because it “unlocks the mystery” of learning for students and helps them clearly understand what they need to do to be successful. She also expressed that this process helped students become more independent and to take greater ownership of their learning.

As with the focus standard initiative, the focus student work was attempted at other sites, but with less success. A principal commented, “I jumped in blindly ... it was too big.” For such initiatives to be successful, in addition to being well structured and supported, they must be well understood and committed to by those leading the effort so that the necessary supports are put into place and that there is a motivation to troubleshoot the inevitable issues that arise.

Inquiry protocols. To facilitate teacher collaborative inquiry using student assessment data, a number of professional development protocols were developed for use at staff or grade-level meetings. Such protocols were used to facilitate collaborative analysis of district and site assessment results, as well as CST worksheet data. All sites had one hour each week for staff meetings and another for grade-level collaborations. On several occasions, a protocol was presented to principals at bi-monthly management meetings using district data, followed by a conversation about how to adapt the protocol for site needs. Principals received the data and other materials they needed to use or adapt for their sites. At other times, the development of a protocol was initiated by a principal to meet site needs, and then collaboratively developed with the district assessment coordinator. These were shared with principals at other sites. The district was in a period rich in design and creativity as it developed skills and knowledge around use of data to inform instruction. One principal commented about this collaborative work, “You are fearless about what you are doing, which is I think a really good stance to take when you're doing things that are frightening.”

Principals' approaches varied in how they engaged teachers at their sites to conduct these analyses, though the various protocols evolved to follow a similar format, which was referred to as a Cycle of Inquiry (Wellman, 2004): teachers made predictions, analyzed data, identified strengths and weaknesses in student assessment data, reflected on possible causal connections to classroom or site practices or curriculum, generated action plans, set new learning targets for students, and established a means to determine whether the new goals were achieved. A principal described the development of these protocols and the development of teachers' skills in analysis at her site:

We spent the first two years developing, I would say, a pretty extensive bank of like probably eight or nine protocols. ... The questions are slightly tweaked but the premise is pretty much the same: 'What are you kind of noticing?' and 'Why do you think you got that?' and 'What are you going to do?' ... I feel like the first two years we built a lot of capacity. Now I just need to ... calendar it...[and] give them a template, with really those three guiding questions and they bring the report that they feel is going to be most useful to them. ... I am really proud, I feel like the teachers are pretty self-sufficient with data analysis right now. ... When I was uploading it [data] for the sub I was, 'oh, let me go see if anybody else has anything in.' My teachers already have their data uploaded... I remember a year or two ago we were at the point where I had to go and say, 'your data is not uploaded,' you know, and now before I even ask it's already in the system.

Principals reported that teachers then collaborated in grade-level teams to implement the plans they created to address student needs. Principals mentioned several positive factors associated with teacher collaboration such as the generative conversations the collaborations initiated. One principal commented, "The conversation is the most important piece."

Equity as a district goal. The district experienced a period of heightened awareness of and interest in issues of educational equity that emerged from the personal priorities as well as the past and shared experiences of district administrators. Many of the principals had long held equity as a site or personal goal. One principal who had at one time left the district then later returned commented, “Upon coming back to Newtown, my push really started to surface around issues of inequity and inequitable practices... [as] a focus for the work that I felt was important to do or to lead.” Another principal recalled that her masters degree program encouraged her to do something bold and socially conscious and that her focus was on classroom decisions that might be influenced by racial stereotypes. Another said about equity, “That was, and is, and continues to be the work that drives me.” Individuals’ prior experiences and predispositions were further strengthened in the summer of 2010 when four managers, two principals and two district office administrators, attended a training facilitated by the National Equity Project. The issues and ideas presented at this training influenced the subsequent design of the district leadership annual retreat. Typically this retreat would include analysis of student achievement data disaggregated by ethnic, language, and socioeconomic subgroups. After the Equity training, the decision was made to also examine the disaggregated data over multiple years to identify possible changes or trends, and to change the question from: “is there a gap?” to “have we made any progress to close the gaps?” To initiate a conversation about equity, the legend that delineated which line was associated with which ethnic group was omitted from the multi-year data

graph, and participants were asked to work in groups to identify which data were associated with which groups (see Appendix M). One principal commented:

I remember just how uncomfortable I felt looking at that chart...I have been in schools long enough to know that those bars at the bottom were gong to be [the performance levels of] either black or Hispanic [students]. And for me being a black female, like, it just hurt me knowing the predictability... You shouldn't start the year knowing that at the end of the year, for this certain group of kids, the line is not going to change.

Another principal expressed her discomfort when attempting to predict which student groups would be associated with the lowest achievement levels. She said, "It's so hard, but we were pretty accurate." A third principal commented, "That's hard to stomach... I think it was a really important first step to even acknowledging that this exists, the problem exists... We're not any different than anywhere else."

Following this exercise, the district adopted the National Equity Project definition of equity to guide future work: Ensuring equally high outcomes; removing the predictability of success or failure correlated with social or cultural factors; and interrupting inequitable practices, eliminating biases, and creating inclusive, multicultural school environments for adults and children. Principals articulated that achieving equity would mean eliminating disparities between groups, and that those disparities extend to many areas such as, "the way we approach instruction, how we approach discipline, how we approach parents, what the expectations are, [and] what our mission statement is." Four key themes emerged from principals' discussions about the relationship between data and their work in the area of equity: first, that data illuminate inequities; second, that data provided an impetus for the need for change; third, that data were useful in helping principals develop teachers' sense of

responsibility for student learning outcomes; and fourth, that data provided a means to monitor progress toward the district goal of equity in achievement.

Data illuminated inequities. Many principals viewed data as a tool to support their efforts to bring awareness of inequities to their staffs. One principal remarked:

When we get our results, whether it's school wide, grade level, individual teacher, the number of kids in intensive intervention, it paints a very clear picture of the gaps. And we talk about that and I make sure they see it. And they do without me even really saying anything.

This principal also described an analysis of English-learner data at her site, stating that these data helped her put the issue “in black and white” for teachers.

Subsequently, the entire staff at her site began to focus on ways to better meet the needs of English learners, “Because we want it to be equitable and... data [show] that we're not doing as well as we want to do.”

Data provided an impetus for change. Principals expressed that analysis of disaggregated data motivated change in teaching practices at their sites, sparking an interest in new learnings, new programs, and greater levels of collaboration. One principal commented that data analyses at her site led to the realization that change is necessary, it is “uncomfortable to look at as a White person, and most of us as teachers are White people... And when you get to the point where you are willing to look at it, and the part that you play in it, then you see it's not okay to stay where you are.”

A principal stated that data and efforts to close achievement gaps drive much of her work, “That is the purpose of me as a principal, and my staff. We need to be constantly working, relentlessly working” with the goal of no longer being able to

identify student groups by their achievement levels. Another principal commented that data take away the need to convince teachers that change is necessary because the data clearly show differences in achievement between groups of students, and so teachers are motivated to change because they believe that change is necessary if they are to become more effective at helping “kids that historically didn’t do well.”

Another principal expressed her gratitude that, because of the focus on data at her site, she is no longer the sole person calling for change. She commented, “Other people are bringing it up... ”

Data provided the means to monitor and measure progress toward equity.

The district’s assessment system was valuable in that it provided teachers with much more than just test results. The system provided over 30,000 multiple-choice questions designed to capture common student misconceptions by including distractor options. Teachers had access to a number of reports immediately after uploading their data. Distractor analysis reports listed which students chose which incorrect answer and what the possible misconceptions were that might have led the students to select that particular distractor, thus giving teachers insight into student thinking and student understandings (see Appendix K for a sample single item distractor report for grade 3). Principals stated that having such useful, current data at their fingertips, data that they and teachers could easily manipulate to identify where students were struggling, which were struggling with a particular concept, and what might be the specific challenges related to a specific standard or concept, was invaluable. It provided the means to differentiate instruction effectively. One principal said that her goal is to

eliminate gaps and that data is the tool that will guide her efforts to achieve that, to allow her to see if the changes she and her staff are making are being successful, and to see how much progress they are making.

Discussion

This study examined collaboration between school site and district leaders to engage teachers in inquiry and analysis of student assessment results and teacher performance data with a focus on formative assessment practices as they relate to equity and opportunity to learn. This paper presented the views and experiences of principals, though teachers' experiences also support the findings. At a Board presentation, one teacher shared her personal experience using the FAIR with her grade-level team:

Each grade level was asked to focus on one teaching strategy that we felt was vital to the development of our students. Our first-grade team focused on oral language development through structured student responses... this key statement is posted next to my plan book to make sure that I'm incorporating this best practice throughout the day. I've also written down these key metacognitive questions [What strategy did you use? What would help you next time? Does this make sense? Why? Have we done something similar?] noted on the walkthrough form as well so that I can be sure to use these questions as I teach my students. They know that I'm going to ask them to talk through how they solved their problems, or to name that strategy that they used.

This teacher makes it evident that the FAIR was the basis for collaborating with her colleagues, for making positive changes in her teaching practice, and for integrating metacognitive strategies in teaching her first grade students.

In another board presentation, two teachers talked about the value of the collaboration that resulted from their site's focus on data. One said:

There's a comfort level to say, 'Hey, how did you get there? What are you doing?' And it's really open where everyone is willing to share.

The other teacher said in response:

I think all of us, we're all learners with our students, learning new things, building on each other, and we're able to share strategies.

One might wonder if this work is making a difference for students beyond merely raising test performance. The answer would most certainly be yes. One teacher remarked about his focus students:

And the students, they fill out a graph, they graph their progress based on a rubric that we create with them. So, going back to goal setting, they really see, 'If I want to go to the next level, these are the steps that I need to do to get there.' So, they're even getting better at analyzing their work and saying, 'well I think I think it's a 3 or I think it's a 4,' and being able to justify that. And when they see what the goal really is rather than, 'I just need to get better at this,' when they see the descriptors of the goal, I think it empowers them and it really motivates them to reach that goal.

Another teacher said:

Students are more fully engaged in the learning process. They have an idea of what their goal is and they know that the learning community...is working together to help them reach that goal.

The data, the FAIR, the analysis protocols, are all the mediating devices that serve to promote dialogue among educators that is focused on what students are learning and ways to best respond in order to better assist their learning. These learning-focused conversations have had positive influences both in the classroom and on student learning, beyond student test performance.

This work focused on increasing student achievement, equity, and opportunity to learn. Some of the greatest changes may have resulted from happenstance and brief exchanges between principals and myself that were only possible because of my role

as assessment coordinator for the district. For example, a principal stopped by my office briefly one day to ask how to log into and use the service provider used for developing school plans. In demonstrating the process, I wrote a few sentences in her plan that contributed to subsequent changes at her site. In her interview, the principal stated: “Having it be part of our plan made a big difference... You wrote it in my SPSA. But this year we wrote it into our SPSA ourselves.” She sent me a card that read, “Thank you for helping me be a better principal. You are very patient and I truly appreciate all your help.”

Possibly the greatest value in this work was that it generated the need for teacher collaboration, which in turn required extensive discussion, negotiation, and planning, and mitigated teachers’ sense of isolation that has so long plagued the field of education. At one site that made significant gains in achievement, teachers attributed the gains to their collaboration. The principal remarked that the teachers at her site, “realized that collaboration is really vital...if one teacher said, ‘well, this is what I am doing and I have seen a great growth in my students,’ then, ‘well, let’s try that in other classes,’ so that there was more sharing.”

One of the primary understandings derived from this study was the critical role that principals play. Sites at which the principals supported teachers with consistent follow up on initiated efforts had greater success with those efforts. This implies that an important role of district administrators is to provide support to principals to help them to provide systematic follow up. Tharp and Gallimore (1988) described such a model of support as the “Triadic Model of Assistance,” for which

the primary role of all individuals within an organizational structure is to assist those they serve to better assist those that they in turn serve. In an educational system, this would imply that the primary role of principals is to assist teachers to better assist their students, and that the primary role of district administrators is to assist principals to better assist teachers. A principal described the latter in this study:

I think ultimately the reason that sites are becoming more proficient with data is because we are not alone; we are collaborating with each other. But we also have you in your particular role... Real help; not giving us the answers but helping us design new protocols and ways of looking at things so that our teachers' hand is always in it. And I think that's hugely important to know that in a district where you turn in an assessment just because the district is asking for assessment, is very different than the district that [we have] with you at the helm, in assessment because it's a partnership. And we are giving you information but you are giving us information right back immediately so that we know how to move forward at the site. I think, what you help the sites to do is you help us work through our thinking, and you help us organize our thinking and then you help us create protocols that will help us elicit that information from the site and dig deeper.

Wells (2009) contends that collaborative inquiry focused on increased opportunities for shared thinking and active engagement in problem solving both between professional developers and teachers and between teachers and students is an important format for teacher professional development. In this study, district administrators worked with principals to analyze FAIR data from across the district, principals worked with teachers to analyze FAIR data at their sites, principals worked with teachers to analyze student assessment data to inform instructional decision making, and teachers collaborated with one another to analyze FAIR data to improve instruction and assessment data to increase learning.

Chapter 4

A Case Study of Teacher-Student Dialogue in the Context of Peer Assessment

After many years of No Child Left Behind's strategies intended to raise achievement and eliminate achievement disparities -- standards-based reforms, state and federal accountability measures and sanctions, and high-stakes testing -- educators across the United States continue to struggle to reduce gaps in achievement between traditionally higher and lower performing groups of students (Gándara, Maxwell-Jolly, & Rumberger, 2008). Though the perceived value of standardized assessments varies considerably among educators, there is agreement that they are highly consequential for children in terms of education, career, and societal opportunities and resources. In California, though overall achievement has shown some measure of growth in the last nine years of standards-based reforms, during which the California Standards Tests (CSTs) have been aligned with state content standards, gaps in achievement persist between students from White, Asian, and higher income groups and African American, Latino, Native American, English learner, and low-income groups (Torlakson, 2011).

Formative Assessment and Dialogic Instruction

Among the plethora of recommendations about how to close these gaps is a longstanding, practical, and well-researched area: formative assessment. This paper presents a case study of teacher-student dialogue in the context of a whole-class peer assessment activity to demonstrate how such formative assessment activities support the use of dialogic instruction. The research question addressed in this study was: Can

formative assessment support a dialogic lesson structure? It was hypothesized that teacher-student interactions in the context of student assessment would include authentic, high-level teacher questions, high-level teacher responsiveness, a substantial proportion of time devoted to discussion, broad participation by students, and longer student responses than what is commonly associated with typical teacher-student dialogue. Black and Wiliam (1998b) conducted a review of the broad range of research on formative assessment and assert that systematic use of classroom formative assessment practices holds possibly the greatest potential for raising achievement for all students and for also producing the greatest gains for the lowest performing students, thus reducing the ever-intractable achievement gaps. They define formative assessment as any formal or informal assessment practices by teachers or students that are subsequently used to inform teaching and learning.

Formative assessment is not limited to tests or quizzes; on the contrary, the research literature on formative assessment focuses on classroom practices that support the deepening of teacher and student understanding about learning, about what students understand and are able to do, such as providing explicit learning objectives, articulating clear expectations for quality work or products, or observing students at work. Other key formative assessment strategies include asking questions that elicit information on what students know and can do in order to guide their thinking toward greater understanding, providing descriptive feedback and opportunities to incorporate the feedback to improve understandings and work products, and student self and peer assessment (Black & Wiliam, 1998a; Kluger &

DeNisi, 1996; Shute, 2008; Stiggins, 2001). The commonality among these practices is that information about student learning is used by teachers or students to inform subsequent teaching and learning.

Pryor and Crossouard (2005) describe formative assessment practices as either convergent or divergent: convergent practices assess *whether* a student is learning, and divergent practices assess *what* a student is learning. They contend that convergent formative assessment practices stem from behaviorist notions of learning and that divergent practices stem from a constructivist perspective. In an examination of the dialogue in divergent formative assessment practices, Pryor and Crossouard found that divergent formative assessment occurs in the context of dialogic interactions that are more conversational in nature and in which questions are asked for which there may be no previously known correct response. They characterized divergent questions as more often having the goal to help rather than to evaluate. Teacher follow-up to student responses was more exploratory or generative, often prompting for more engagement and more detailed explanations of the learner's reasoning, and with diminished attention to student mistakes. These observations suggest that instructional practices in which teachers seek to better understand their students' knowledge and skills may alter the nature of teacher-student dialogue by including greater elicitation of students' questions, explanations, and elaborations, and may support instruction that is more dialogic than is currently the norm.

Nystrand, Gamoran, Kachur and Prendergast (1997) contend that learning to think relies on active engagement in effective interactions much like those described

by Pryor and Crossouard (2005) as divergent formative assessment practices, and that these interactions are closely associated with student learning. More specifically, Nystrand (2003) reported a strong positive association between student achievement and dialogic instruction, such as classroom use of authentic teacher questions, high-level follow-up to student responses, and time devoted to discussion.

Wertsch and Toma (1995) state that though we have strived to achieve changes in classroom discourse for several decades, teacher-student interaction has proven resistant to change. However, because of the strong association between dialogic instruction and student achievement, Nystrand et al. (1997) argue that we need to better understand how teachers can organize classrooms to enhance dialogue. Wells agrees and suggests that “opportunities for learning and knowing are crucially dependent on the nature of the activities in which students engage and on the functions that language performs in these activities” (2001b, p. 12). The present study illustrates how formative assessment strategies can be integrated into a common classroom practice such as daily reading logs as a means to increase dialogic instruction. The purpose of this study is to better understand how making teaching more responsive through the use of formative assessment influences student thinking and student participation in classroom dialogue.

Student Self and Peer Assessment

Student self and peer assessment is an important formative assessment activity, which research has found to be effective in promoting learning (cf. Black & Wiliam, 1998b; Bransford, Brown, & Cocking, 2000; Crooks, 1988; Hattie & Timperley, 2007). Such forms of student assessment serve two primary functions: first, engaging in self or peer assessment provides a means for students to monitor their understanding or abilities in relation to a learning goal; and second, they provide the basis for generating plans to deepen understandings or progress toward the goal. Student assessment has been shown to generate self-provided feedback, increase efforts to apply feedback, develop student proficiency in seeking help, and increase students' ability to self-regulate their actions and monitor progress toward the learning goal, all of which are associated with greater learning (Hattie & Timperley, 2007). Student assessment also plays an important role in self-identifying and reconciling immature or faulty conceptions (Black & Wiliam, 1998b). Additionally, student assessment is an important component of metacognition. Knowledge about learning goals, how student work and understanding relate to learning goals, and the generation of plans or actions to address identified gaps or needs, are central aspects of both formative assessment and metacognition. Bransford, Brown, and Cocking (2000) hold that student learning is promoted by teaching self-evaluative or metacognitive strategies within subject-matter instruction. Research on expertise also supports the value of student assessment: experts frequently assess their progress when engaged in problem solving, carefully monitor their understanding, know when

they need more information or clarification, are watchful for new information that is inconsistent with current understandings, and create analogies to assist their own understanding.

While there is agreement about the value of student self and peer assessment in learning, there is limited understanding of the nature of the teacher-student dialogue that it engenders. The purpose of this study is to conduct a case study of teacher-student dialogue in the context of a whole-class peer assessment activity to demonstrate how it is consistent with dialogic instruction. It is hypothesized that whole-class peer assessment can be a divergent formative assessment practice (Pryor & Crossouard, 2005), and that teacher-student interactions in the context of peer assessment can be dialogic and include authentic, high-level teacher questions, high-level teacher responsiveness, a substantial proportion of time devoted to discussion, broad participation by students, and longer student responses than has been documented in typical teacher-student dialogue.

Though the research on student assessment is extensive, there is an important limitation to keep in mind regarding this body of research: Though this research has focused on factors such as the degree of elaboration of feedback, it has not specifically addressed the nature of teacher-student interactions within the various interventions studied, nor has it differentiated the research findings between those of convergent and divergent formative assessment practices. This study will attempt to address this limitation by examining teacher-student dialogue in the context of a whole-class peer assessment activity.

Sociocultural Theory and Dialogic Instruction

This paper uses the lens of sociocultural theory to better understand the value of dialogic instruction in formative assessment. The origins of sociocultural theory can be found in the work of L. S. Vygotsky (1978, 1981, 1987) who held that the means that we use to perceive and process our experience, such as our thinking processes, ways of reasoning and interpreting, or problem solving, develop initially from the social interactions that we have with others in our environment. These social interactions are mediated primarily by language. Vygotsky proposed that “the very mechanism underlying higher mental functions is a copy from social interaction; all higher mental functions are internalized social relationships (1981, p. 184). He referred to this process as “internalization” and suggested that this is not merely the transfer of a semiotically-mediated, intermental process to an intramental one, but rather a process through which an intermental process is restructured to create a related but altered intramental process.

Vygotsky (1978) drew a clear distinction between learning and development, and claimed that learning is a precursor to the development of mental functions. The learning of content, such as word meanings or problem-solving processes, establishes the foundation for the development of the thinking and problem solving processes. To explain this relationship, Vygotsky introduced the concept of the *zone of proximal development* (ZPD), which he described as the difference between independent performance and performing with assistance. Wells (2001b) and Ash and Leavitt (2003) argue that the ZPD is not a fixed individual attribute; rather, it represents a

range of individual potential that is determined within a given activity by the available resources, or mediating devices, such as the knowledge, skills, beliefs, values, attitudes, and experiences contributed by participants; the material resources or cultural artifacts available; and the actions, dialogue, and processes in which the participants engage.

It is implicit in the notion of ZPD that assessment must be sufficiently sensitive and immediate that it can inform the provision of assistance. Additionally, expanding the ZPD increases an individual's opportunities for learning and subsequent development. Therefore, an important goal of instruction should be to assist learners to develop the agency and skills necessary for self-expansion of their ZPDs through formative assessment strategies such as asking questions of themselves and others, seeking resources, or seeking the assistance of more capable others.

Though Vygotsky focused on words as essential for the development of meaning, Bakhtin (1986) asserted that meaning can only be derived from utterances, or speaking turns, along with their interplay with others' preceding and subsequent utterances. Utterances, unlike individual words, can convey emotions, emphases, and values. Furthermore, Bakhtin stated that it is our interactions with others, our conflicts, disagreements, and arguments, that most promote the development of our thinking.

Together, these sociocultural concepts strongly argue for the importance of interaction and discourse in shared activity between individuals with varying levels of expertise with the goals of connecting understandings between experts and novices,

learning objectives with individual ZPDs, and everyday and schooled understandings. Language plays a key role in the development of shared understandings. These shared understandings, as well as thinking processes, attitudes, and values, are appropriated by individuals for later self-directed application in novel activity. Sustained, inclusive interactions between teachers and students as they together engage in joint activity are an important consideration for today's classrooms.

Mercer (2002) asserted that the main goal of education should be to help students develop the capacity to use language as a tool for collective thinking. Dialogic instruction structures opportunities for students to use language as a tool for thinking, reasoning and problem solving. A key aspect of dialogic instruction is that the utterances of teachers and students, as well as text, are treated as thinking devices to be questioned, extended, reshaped, and incorporated into individuals' communicative repertoires. Classroom discourse can be classified according to how well it supports students in assimilating new understandings from their personal perspectives, experiences, and values; and it is dialogic to the extent that teachers and students extend and adapt one another's utterances (Nystrand, 2003; Nystrand, Gamoran, Kachur, & Prendergast, 1997).

Many theorists have held that there are two basic functions of discourse: a monologic function which is to convey meaning, and a dialogic function which is to create meaning (Bakhtin, 1986; Gutiérrez, 1993; Nystrand, Gamoran, Kachur, & Prendergast, 1997; Wells, 2007; Wertsch & Toma, 1995). These functions are consistent with the constructs of convergent and divergent formative assessment

practices described by Pryor and Crossouard (2005). In the monologic function, dialogue is intended to be communicated to and received by others and is not intended to be open to interpretation, questioned, or responded to. The content of monologic dialogue is considered objective and static. In the dialogic function, on the other hand, language is used to generate new meanings and understandings through the exchange of ideas. In contrast to the presumed static and objective monologic content, in the dialogic function, knowledge is treated as personal, emerging, and incomplete, and is thought to be created in dialogue between people engaging in shared activity. In classrooms, monologic instruction may take the form of lecture, recitation, or direct instruction, with limited opportunities for student voices to be expressed and ideas to be worked through; dialogic instruction is rich in collaborative interactions with students articulating their thoughts and feelings, experiences and understandings, and their uncertainties as they grapple with new content to formulate knowledge and deepen their understandings.

Decades of research demonstrate that the vast majority of classroom dialogue is monologic (cf. Applebee, Langer, Nystrand, & Gamoran, 2003; Mehan, 1978; Nystrand, 2003; Nystrand, Gamoran, Kachur, & Prendergast, 1997; Wells, 1986). Numerous studies that have examined teacher-student dialogue in classrooms have identified a common interaction pattern. For example, Mehan (1978; 1979; as cited in Polman & Pea, 2001) referred to this common teacher-student interaction pattern as IRE (initiation, response, evaluation) in which the teacher *initiates* an exchange, typically with a known-answer question, a student supplies a *response*, then the teacher

evaluates the student's response. Lemke (1990) called this pattern as QAE: question, answer, and evaluation. Wells (2006) has proposed an IRF pattern (initiation, response, follow-up) that encapsulates a greater diversity of teacher follow-up moves, such as requesting student elaboration or explanation, building on the student response, or asking a question to guide student thinking, and is not necessarily indicative of monologic instruction.

Classroom research on dialogic instruction has provided many insights into current understandings of teacher-student dialogue. For Example, Nystrand et al. (1997) reported that discussions occurred for less than one minute per lesson on average, that nearly all teacher questions were test questions as opposed to authentic questions, and that students' primary contributions consisted of one and two word responses to teacher questions. Nystrand et al. also reported a strong association between student achievement and the extent of dialogic classroom discourse, indicated by the proportion of authentic vs. test questions, high-level evaluations, extent of uptake, and time devoted to discussion. They were especially interested in the transitions from monologic to dialogic exchanges and reported that such transitions were most often initiated by student questions. In addition, Wells (2007) reported that, in his collaborations with teachers to create inquiry-based instruction that supported dialogic classroom interactions, classrooms became more dialogic over time, as indicated by teachers asking more authentic questions, an increase in teacher uptake, and a greater number of student-initiated questions.

Wells and Nystrand et al. both noted, however, little change between monologic and dialogic instruction in two aspects of teacher-student exchanges: first, the well-documented and pervasive pattern of teacher-student interactions—initiation, response, follow-up (IRF)—persisted in both, and second, teachers maintained their control over turn-taking in whole-class discussions. Wells did, however, note a change in the nature of teachers' follow-up moves in that they most often merely acknowledged student responses rather than evaluated them, and that teacher initiations were less often a question and more often a nomination or invitation for a new student contribution.

The present case study of teacher-student dialogue in the context of a whole-class student assessment activity will examine teacher questions, teacher responsiveness, time devoted to discussion, participation by students, and student response length to demonstrate how teacher-student interactions in this context are consistent with dialogic instruction. This illustrates how formative assessment strategies can be integrated into a common classroom practice to support the use of language as a tool for collective thinking.

Method

Participants

Participants in this case study were a 38 year-old female Indian-American teacher with seven years of teaching experience and 18 sixth-grade students 11 girls and 7 boys, in an urban elementary school in Northern California with 404 students: 51.0% Hispanic/Latino, 8.2% African American/Black, 16.2% Asian, 13.4% White,

9.5% Filipino, 63% socioeconomically disadvantaged, and 42 % English learners.

The group of participating students was similarly diverse and was 33.3%

Hispanic/Latino, 17% Filipino, 17% Asian, 11% Pacific Islander, 6% Asian Indian, 6% American Indian, 6% White, and 6% African American. In addition, 72% percent were socioeconomically disadvantaged and 46% were English learners or reclassified English learners. Students were regrouped from their primary classrooms for the Language Arts instructional block to reduce class size and to allow replacement intensive intervention Language Arts for students who were significantly behind in reading. At the time of this study, the school had an Academic Performance Index of 771 out of 1000 with 800 being the minimum target on the state accountability system, and a federal accountability AYP percent proficient in Language Arts of 42.8% and mathematics of 58.2%.

The participating teacher had attended six one-hour professional development sessions on formative assessment during the 2009-10 school year between September 8th and February 4th. At the final session, the teacher reported that during the school year she had increased her use of numerous formative assessment strategies, including engaging students in peer or self assessment, setting goals, and monitoring their progress; use of higher-order questioning strategies; providing ongoing descriptive feedback to students with opportunities to incorporate the feedback to improve their work and deepen their understandings; and providing students with models of strong and weak work. On multiple occasions that year and the following year, 2010-11, the teacher was regularly observed and received feedback from the

principal on her use of formative assessment and additional focus strategies of the school and district using the Formative Assessment and Interaction Record (FAIR) classroom observation tool (Hilberg, 2012). Additionally, during the 2010-11 school year, the teacher had multiple opportunities to use FAIR to observe colleagues at her site and another school in the district.

Procedures

One peer-assessment reading log lesson was observed by the researcher and principal, and three additional lessons were video recorded by the researcher using two digital camcorders, one placed at the back of the room facing the front, and on occasion moved to capture specific exchanges, while the other was placed at the front of the room facing students. The three videotapes were transcribed. These lessons were instances of an ongoing activity setting that incorporated several formative assessment strategies and were similar in format and length. One lesson was selected to serve as the case study for this research.

Analysis

The selected transcript was analyzed using discourse analysis. The following conventions were followed for transcriptions:

- Pauses and hesitations were omitted
- Truncated speech was transcribed as though fully expressed, for example, “okay” was used when the verbalization was “kay” and “them” when the verbalization was “em”
- Ellipses indicate incomplete sentence

- SS denotes multiple overlapping verbalizations
- T denotes teacher
- < > denotes overlapping speech
- [] denotes observer comments
- CAPS were used to indicate emphasis
- { } indicates uncertainty of the accuracy of the transcription

After completing the transcript as described above, aspects of Wells' (2001a) procedures for discourse analysis were applied: first, the entire episode, defined as the interactions that occur within a single recognizable task, was segmented into sequences, which are defined by Wells (2001) as a nuclear exchange and all other connected exchanges. These divisions provided an initial, general understanding of how the lesson unfolded. A nuclear exchange consists of an opening move in which the speaker introduces a purpose in the form of goods or services; this is followed by one or more responding moves by other speakers, and possibly one or more follow-up moves by the initiating speaker; the sequence may also include additional exchanges, either preparatory, dependent, or embedded, that contribute to the purpose introduced in the initiating move. After this segmentation process was completed, exchanges and individual utterances were coded for a number of variables of interest, defined below.

Lesson Description: Whole-Class Peer Assessment of Student Reading Logs

Each week throughout the school year, this class focused on one of a set of “thinking strategies” that would be practiced during at-home, or “choice,” reading. The strategies varied and included determining cause and effect relationships,

summarization, and questioning, to name a few. All thinking strategies are mental processes to deepen student understanding of written and oral text. The goal of the lesson analyzed here was to develop students' skills with the thinking strategies of inferencing, which the teacher described as determining what the author is trying to tell you without explicitly stating it. It is important to note that the focus of this lesson was on developing students' understanding and use of the thinking strategy of inferencing; it was not on developing students' understanding about a particular text. Each student applied the thinking strategy during at-home reading of a self-selected text.

It is also important to note that reading logs are a common means used in schools to regulate and monitor student reading. A typical class procedure for reading logs at this school, and most likely elsewhere, is for students to keep a log of what they read, and possibly including a brief summary, and for the teacher to record that the student had completed the required reading. The lesson analyzed here goes far beyond the typical practice in that the teacher takes advantage of students' choice reading as an opportunity to help students learn thinking strategies that would become tools for them to use in class as well as beyond, both now and in their futures, and in all content areas. The principal described this lesson as representing the kind of teaching she felt could help put students on a different learning trajectory because of the high level of rigor and the generalizability of the thinking strategies that constituted the lesson content.

Students came to class with a log of the prior night's reading, the title of the book, the author, the book genre, and the specific pages read. For the inference reading log task, students were to identify specific passages in the text that functioned as an inference, and then to describe what they believed to be the author's intended inference.

Students were seated in individual desks arranged into two horseshoe arrangements of eight desks, individual desks facing the front of the room, with each horseshoe arrangement opening to the center of the room. Two students sat in a row of paired desks behind the horseshoes.

Students were familiar with and much enjoyed this classroom activity setting. The peer assessment activity integrated several strategies that are central to the research on formative assessment, including peer assessment, higher-order questioning/reasoning (e.g., evaluation), feedback with opportunities to incorporate the feedback to deepen understandings, and the provision of models of strong and weak work products. The lesson episode consisted of 12 sequences (see Table 3), and began with the teacher collecting students' reading logs from the previous night's homework. The class then discussed and listed on the white board the criteria by which they would evaluate the selected reading logs. The first log was selected using "equity sticks," (i.e., Popsicle sticks with students' names used to randomly select students). The log was presented to the class by the author with some interaction with the teacher asking questions for clarification. Students next worked in groups to discuss, evaluate and generate a grade for the reading log. A rating of "check minus"

represented that the reading log did not meet the specified criteria; a “check” indicated that it adequately met the criteria; and a “check plus” indicated that it was an exemplary reading log. The small group evaluations were followed by a whole-class discussion with the goal of exchanging views on and negotiating an appropriate grade for the reading log; it was not to determine a definitive or “correct” grade. The process was repeated with a second log. The final sequence of the lesson consisted of recitation-type exchanges, characterized by the teacher asking a question, a student being selected to respond, and then often followed by the teacher evaluating the students’ response. In this sequence, the teacher provided multiple examples of student work for students to classify as either inference or prediction, in response to an apparent confusion among several students between the two thinking strategies.

Table 3

Sequence of the Whole-Class Peer Assessment Activity

Lesson Sequence	Description	Length
1	Establish evaluation criteria: Whole class discussion	2 min 28 s
2	Selection of student reading log for evaluation	13 s
3	Selected student presents and explains reading log	3 min 2 s
4	Student groups discuss and rate reading log	1 min 17 s
5	Whole-class discussion and rating of reading log	4 min 30 s
6	Selection of second student reading log for evaluation	1 min 7 s
7	Second selected student presents and explains log	1 min 44 s
8	Student groups discuss and rate second reading log	1 min 37 s
9	Whole-class discussion and rating of second log	6 min 16 s
10	Student groups reconsider and discuss rating of second log	48 s
11	Whole-class discussion and rating of second log	1 min 39 s
12	Whole-class recitation-type exchange	2 min 31 s

Measures and Variables

Teacher questions. Nystrand et al. (1997) coded teacher questions as either test or authentic. Although they defined known answer questions as test questions; some test questions can, in fact, serve to extend or challenge student thinking (e.g.,

“Is that one of the criteria?”). Additionally, questions that elicit relevant prior knowledge, while requesting “known” information, can also serve an important function for extending thinking, deepening understanding, and establishing a shared knowledge base for discussion or shared activity. Because the purpose of some questions that would fall into the “test question” categorization in Nystrand et al.’s taxonomy would constitute questions that function to assist, and not to merely assess, the taxonomy used for this analysis segmented test questions into three distinct categories (see Table 4). Questions that were procedural in nature, such as questions that are requests for clarifications, participation, or affirmation, were not included in the analysis.

Table 4

Teacher Questions

Question Type	Definition	Function: Assess or Assist
Test 1	Request for known information, functioning to assess student understanding	Convergent/Monologic
Test 2	Request for known information, functioning to guide and extend student thinking	Divergent/Dialogic
Test 3	Elicit relevant prior knowledge, functioning to assist connections in student thinking	Divergent/Dialogic
Authentic	Question with no prescribed answer asked to obtain information, not to determine if or what students know	Divergent/Dialogic

Cognitive level. Teacher questions were also coded for cognitive level, meaning the cognitive level of thinking required to respond to the question. In the research literature, the cognitive level of teacher questions is most often coded according to a two-level taxonomy as either low or high. For example, Wells' (2006) taxonomy describes low cognitive level as rote recall, previous conversation, and memory; and high cognitive level as generalization, analysis, or speculation. Similarly, Nystrand et al. (2003) define two levels with low constituting a record of an ongoing event or a report of old information and high constituting generalization, analysis, or speculation. Pierson's (2009) concept of intellectual work also maintains the two-level taxonomy, but is applied to teacher demand *and give* follow-up moves, as opposed to exclusive application to teacher demand moves. In the Pierson taxonomy, low represents providing or requesting information or confirmations, and high represents providing or requesting interpretations, justifications, explanations, examples or counter examples, or generalizations. In this study, a three-level taxonomy was used (see Table 5), which was previously used in an analysis of classroom discourse and which found correspondence between the cognitive level of teacher questioning and the cognitive level of student responses (Hilberg, 2007). This taxonomy is similar to that used by Webb, Nemar, and Ing (2006) for levels of teacher responsiveness in follow-up moves in that explanations or rationales are aspects of the highest level. There are two key differences between this taxonomy and others commonly used: first, it differentiates between speculation and speculation for which a rationale is provided or requested, and second, it is applicable to both teacher

and student moves, which is why the term “cognitive level” is used rather than the term “cognitive demand” found more commonly in the literature.

Table 5

Cognitive Level

Level	Definition
Low	Recall of literal or known information; description of observed phenomena
Medium	Unfounded speculation, opinion, position taking
High	Analysis; explanation; founded interpretation, speculation or prediction; connecting to prior knowledge

Responsiveness. Teacher follow-up move responsiveness was coded using Pierson’s (2008) taxonomy (see Table 6).

Table 6

Responsiveness

Level	Definition
Low	Follow-up that is not responsive to student ideas: evaluations, rebroadcasts, acknowledgments, statements, or questions that do not build on student ideas
Medium	Teacher corrects incorrect responses, provides an answer with no explanation, reformulation of student idea, incorporation of student recitation response
High 1	Teacher thinking. Teacher responds to a student question; corrects a student misconception or provides corrective feedback or expands on student ideas using teacher's own reasoning
High 2	Student thinking. Teacher requests student to explain or expand his/her thinking; challenges student thinking by asking a question or making an observation that contradicts student ideas

Initiations. Initiations are the utterances that initiate an exchange. Initiations were coded according to source: Teacher or student, and, if the initiation was also a teacher follow-up move in the previous sequence, the level of responsiveness of that follow-up move.

Discussion. Discussion is defined as exchanges between at least three students and the teacher for a minimum of 30 seconds (Nystrand et al., 1997).

Student turns. Student speaking turns were coded for mean word length.

Student participation. Student participation was coded only for student speaking turns in whole-class and small-group organizations.

Results

Teacher Questions

The majority, 82.8%, occurred in teacher follow-up moves, rather than in teacher initiation moves. Questions asked to test if or what students know comprised 17.2% of the teacher questions, known-answer questions asked to guide or extend student thinking comprised 20.7% of the questions, questions asked to elicit relevant prior knowledge to establish a foundation for making connections comprised 6.9% of the teacher questions, and 55.2% of the questions were authentic teacher questions. Additionally, 62.1% of teacher non-procedural questions were rated at level 3 for cognitive level.

Responsiveness

Teacher responsiveness overall was rated as low in 43.1% of the follow-up moves, medium in 7.8% of the moves, high 1 in 29.4% of the moves, and high 2 in 19.6% of the moves (see Table 7). When broken down into the various sequence types, there was a large variation, with medium and high-level follow-up moves not occurring at all in the reading log selection sequences, and comprising 67% of the follow-up moves in the evaluation criteria sequence, 44.4% in the reading log presentation sequences, 58.3% in the whole-class evaluation discussion sequences, and 33.3% in the recitation sequence.

Table 7

Teacher Follow-Up Responsiveness

Sequence Type	Low	Medium	High 1	High 2
Establish Criteria (1)	2 (33%)	0 (0%)	4 (67%)	0 (0%)
Select Reading Log (2)	3 (100%)	0 (0%)	0 (0%)	0 (0%)
Student Presents Log (2)	4 (44.4%)	1 (11.1%)	2 (22.2%)	2 (22.2%)
Whole-Class Discussion (3)	10 (41.7%)	0 (0%)	6 (25%)	8 (33.3%)
Recitation (1)	3 (33.3%)	3 (33.3%)	3 (33.3%)	0 (0%)
TOTAL	22 (43.1%)	4 (7.8%)	15 (29.4%)	10 (19.6%)

Initiations

There were a total of 66 exchanges in the 9 whole-class sequences: 12 were initiated by students and 54 by the teacher. Of the 12 student initiations, three were related to procedures and the remaining were contributions to whole-class discussion. Though the teacher initiated 83.3% of the exchanges in whole-class discussions, two things should be noted. First, multiple opportunities were interspersed throughout the lesson in which students worked with peers to discuss, evaluate, and grade the reading logs. Initiations in these exchanges were not included in this analysis, though they would have been initiated by students. Secondly, according to Wells' coding scheme (2001a), when a teacher follow-up is in the form of a question/demand, then

it also initiates a new sequence. Of the 54 teacher initiations, 39 constituted follow-up moves of the previous sequence, and of those, 30 were high-level.

Class Discussions

Discussions occurred in five of the twelve sequences: establishing the evaluation criteria, the two student presentations of reading logs, and during the whole-class evaluation discussions. Together, discussions comprised 72.2% of the duration of the lesson.

Student Participation

In the lesson, there were six different types of sequences: the initial sequence in which the teacher elicited evaluation criteria for an inference reading log; two brief sequences in which a student reading log was selected; two sequences in which a student presented her reading log with some explanation and teacher questioning; three sequences of whole-class discussion on evaluating the reading log; three sequences in which student groups discussed and rated a reading log; and a final sequence in which the teacher quizzed students by providing several student samples and students responded chorally. In all, 15 of the 18 students, 83%, participated in a whole-class sequence, which comprised 86.4% of the duration of the lesson, and all students participated in the small groups, 13.6% of the lesson.

Table 8 presents the number and percentage of teacher and student turns per sequence type, as well as the number of minutes per type. The percentage of teacher and student turns was relatively balanced in the criteria selection, student presentation, and recitation sequences, and there was a larger percentage of student

turns in the reading log selection and whole-class discussion sequences. Teacher word counts exceeded those of student word counts in all sequence types with the exception of student presentations of reading logs in which the teacher contributed 39.4% of the words to the discussions and students 60.6%. Similarly, in all sequence types, the average teacher words per turn exceeded those of students with the exception of the student presentations of their reading logs. In the whole-class discussion, which comprised 45.6% of the duration of the lesson, the average teacher turn was 36.1 words and the average student turn was 18.3 words, though the teacher had 30 turns and students 50 turns, so that the total number of words contributed by the teacher and students in the whole-class discussions was similar, 1083 for the teacher and 915 for students.

Table 8

Teacher and Student Talk

Sequence Type	Min	Teacher Turns	Student Turns	Teacher Word Count	Student Word Count	Avg. Teacher Words Per Turn	Avg. Student Words Per Turn
Establish Criteria (1)	2.5	10 (52.6%)	9 (47.4%)	211 (81.2%)	49 (18.8%)	21.1	5.4
Select Reading Log (2)	1.3	6 (28.6%)	15 (71.4%)	79 (64.8%)	43 (35.2%)	13.2	2.9
Student Presents Log (2)	4.8	11 (55.0%)	9 (45.0%)	222 (39.4%)	341 (60.6%)	20.2	37.9
Whole-Class Discussion (3)	12.4	30 (37.5%)	50 (62.5%)	1083 (54.2%)	915 (45.8%)	36.1	18.3
Recitation (1)	2.5	10	10	283	na	28.3	na
Student Groups (3)	3.7	--	--	--	--	--	--
TOTAL	27.2	57	83	1595	1348	28.0	16.2

Note: Other than total minutes, totals do not include student group sequences.

Discussion

This paper presented a case study of teacher-student dialogue in the context of a whole-class peer assessment activity. The purpose of this study was to demonstrate how integrating formative assessment strategies into simple classroom routines can create a context for dialogic instruction. The data presented here demonstrated that a

whole-class peer assessment activity, an important formative assessment strategy, can be consistent with many aspects of dialogic instruction.

There is extensive research on the value of formative assessment in general, and student self and peer assessment in particular, for promoting learning as well as a number of other positive student outcomes, including self-monitoring of understanding, planning and regulation actions to achieve a learning goal, internal feedback, efforts to seek and incorporate feedback, and identifying and rectifying students' misconceptions (Black & Wiliam, 1998a; 1998b; Hattie & Timperley, 2007). There have also been efforts to differentiate convergent from divergent formative assessment practices in the formative assessment literature. There is, however, a paucity of research that examines the dialogic aspects of self and peer assessment and even less research focused specifically on dialogic instruction in the context of formative assessment. The case study reported here examined a whole-class peer assessment activity to demonstrate in what ways it is dialogic. The research question addressed in this study was: Can formative assessment support a dialogic lesson structure? It was hypothesized that teacher-student interactions in the context of student assessment would include authentic, high-level teacher questions, high-level teacher responsiveness, a substantial proportion of time devoted to discussion, broad participation by students, and longer student responses than has been documented in typical teacher-student dialogue.

This study found that recall or test questions comprised 17.2 % of the teacher questions, and that 55.2% of the questions were authentic, and that another 27.6% of

the known-answer questions actually functioned to assist student thinking rather than to merely assess student knowledge. This study also found that 62.1% of questions required higher order thinking. Teacher questioning in this whole-class peer assessment activity exhibited a level of assistance questions, authentic questions, and high cognitive level questions consistent with that found in other studies of dialogic instruction. For example, in her extensive synthesis of research that spanned a 50-year period, Gall (1970) reported that the purpose of 60% of teacher questions is to recall factual information, which is considerably greater than that found in this study. Nearly thirty years later, Nystrand et al. (1997) found that authentic questions, which they assert are more likely to require higher-order thinking, averaged only 10% to 27% of teacher questions, whereas in this study, 55.5% were authentic.

This study found that, though the percentage of low-level responsiveness was similar to that reported by Pierson (2009), 43.1% and 41.5%, respectively. The percentage of high-level responsiveness was considerably higher, 49.0% and 20.8%, respectively. Alternatively, Applebee, Langer, Nystrand and Gamoran (2003) found that 31% of teacher follow-up responsiveness was high level. Given these comparisons, it is possible to conclude that high-level follow-up responsiveness may be afforded in the context of whole-class peer assessment.

In this study, discussion constituted the majority of the lesson. When we contrast this with Nystrand et al.'s (1997) report that discussion occurred less than one minute per day on average, it can be reasonably concluded that discussion was a strong component of this lesson.

In this 27-minute lesson, all students participated in the student small-group discussion sequences. These sequences, however, comprised a small portion of the lesson. In the whole-class sequences, 83% of students participated, which could arguably be described as broad participation. Tharp and Gallimore (1988) argue that whole-class discussions, in general, provide insufficient opportunity for student participation due to the size of the group. Though this lesson included interspersed sequences of small-group discussions that afforded greater opportunity for student participation, a consideration for all teachers is to ensure a balance between whole-class and small-group organization to ensure participation by all students and to keep students engaged.

Student turns on average were 16.2 words across the entire episode. Turns were somewhat longer in whole-class discussion sequences: 18.3 words. These response lengths are consistent with the length of student responses reported by Nassaji and Wells' (2000) and Hilberg (2007) in analyses of dialogic inquiry. By contrast, Nystrand et al. found that students' primary contributions consist of one and two word responses to teacher questions.

Taken together, these results indicate that this whole-class peer evaluation activity is consistent with features of dialogic instruction. This is important because it may provide some insight into why formative assessment is effective in promoting learning, and why formative assessment can support features consistent with dialogic instruction. This lesson is also consistent with Wells' (2007) findings that, even in dialogic inquiry, teachers tend to maintain control over student turn taking in

discussions and that the IRF teacher-student interaction pattern persists even in highly-dialogic lesson episodes.

Haertal, Moss, Pullin, and Gee (2008) maintain that a socioculturally-informed theory of learning calls for classrooms that support connections with “students’ prior knowledge and experiences, explicit instruction that involves connections between academic and everyday language, just-in-time feedback as experienced in unfolding, meta-conversations about how you know what you know, [and] activities that permit meaningful participation in the group’s work” (p. 8). The lesson presented here is an example of such a lesson: it began with the teacher eliciting relevant prior knowledge on evaluation criteria, and included rich teacher-student interactions that supported the development of student understandings, as well as explicit instruction on thinking strategies. Teacher-student interactions, including those described here in a whole-class peer assessment activity, play a key role in the development of shared understandings between people. Shared understandings, as well as thinking processes, attitudes, and values, are appropriated by individuals for later self-directed application in novel activity. Therefore, an important consideration for teaching should be the kinds of shared understandings and thinking processes we wish to engender in students. Many forms of formative assessment, such as student self and peer assessment, have the potential to change the bounds of what we are able to understand, expand the ways by which we learn, and to develop powerful habits of thought.

Tharp and Gallimore (1988) have long held that achieving equity in the classroom will require a reorganization to allow the teacher to responsively assist students to deepen their schooled understandings to a greater degree than can be accomplished in peer-only interactions or whole-class recitations. There are important questions about whole-class organization that remain, such as, what are the different consequences of active and passive participation? Is listening as valuable a form of participation as active contributions, and, if not, who benefits in whole-class organizations and who does not? Whole-class organization may constrain significant participation simply because, as the number of participants increases, the opportunity for individual participation decreases. Additionally, it is possible that whole-class discussion may be systematically inequitable, given teacher bias, intended or unintended.

Mercer (2002) claims that the determining factor in the effectiveness of instruction is the effectiveness of the teacher in using dialogue. According to Wells (2007), the critical features are the degree to which instruction engages students in thinking and not just repeating others' understandings and that the teacher's stance toward learning be dialogic: oriented toward the construction of knowledge through discourse in shared activity. Nystrand et al. (1997) claim that the critical factor is that teachers take students' input seriously and provide ample opportunity for students to deepen understandings by talking things out. Wells (1999b) describes progressive discourse as dialogue that supports such collaborative knowledge building. He contends that a major aim of educational research should be to explore what forms

progressive discourse might take and what conditions enable it to occur. I concur and suggest that educational research should explore classroom activity settings that may support quality dialogic interactions.

Chapter 5

Conclusion

There are a number of reasons for urgency in finding ways for more children to be successful in school. Success in school is associated with many positive outcomes. Conversely, students who do not experience success in school are vulnerable to a number of consequences including poor health, poverty, unemployment or incarceration (Alliance for Excellent Education, 2011). Disparities between the rates of school success of students from different racial, ethnic, language, and economic groups persist. For example, though around 80% of Asian and White students graduate from high school, only 58%, 57%, and 54% of Hispanic, African American and American Indian students graduate, respectively (Editorial Projects in Education, 2011), and students from lower income families drop out of high school at six times the rate of their peers from higher income families (U.S. Department of Education, 2011).

Research has demonstrated strong associations between formative assessment and student achievement in a number of domains including language arts, mathematics and science, and there are many advocates of classroom use of formative assessment as a means to help more students achieve school success (Black & Wiliam, 1998; Crooks, 1988; Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Natriello, 1987). The studies reported in this dissertation focused specifically on three forms of formative assessment: questioning, feedback, and student self and peer assessment. The overarching purpose of these studies was to explore the connections

between formative assessment, equity and opportunity to learn from a sociocultural perspective. The goals of the individual studies conducted were to (a) develop a reliable tool for use by district administrators that could support their work to increase teachers' use of formative assessment with the premise that use of research-based instruction would expand students' opportunities to learn and thereby increase student learning and decrease gaps in achievement, (b) document principals' leadership and professional development on the formative use of teacher performance and student assessment data with the goal of increasing teachers' use of research-based instruction to better meet individual student learning needs, and (c) demonstrate how the use of formative assessment might support dialogic instruction, which is also associated with greater student achievement, by examining teacher-student dialogue in the context of a whole-class peer assessment activity.

Formative Assessment from the Sociocultural Perspective

The research reported here looked at formative assessment from a sociocultural perspective. Much of the research to date on formative assessment has come from multiple disciplines, primarily behavioral, cognitive, and social-psychological, and is based on numerous discipline-specific theories such as control theory, attribution theory, goal-setting theory, or social cognition theory. It has not been until recently that education researchers have begun to explore a sociocultural perspective as a basis for deepening our understanding of the role and value of formative assessment in learning and development (Ash & Levitt, 2003; Moss, Pullin, Gee, Haertal, & Young, 2008; Pryor & Crossouard, 2005). It is proposed here that

sociocultural theory offers some insight into the research findings on formative assessment. Ash & Levitt (2003) and Black & Wiliam (1998b) describe formative assessment as a two-part process in which learners—teachers or students—first assess the gap between what they know or are able to do and the learning goal, and then take action to close that gap to attain the desired goal. From a sociocultural perspective, formative assessment can be described as responsive assistance in the zone of proximal development, the process of first assessing an individual's current knowledge and abilities and then, based on that initial assessment, providing the assistance necessary to assist the learner achieve what he or she is not yet able to do independently in the upper reaches of his or her zone of proximal development.

The three formative assessment strategies that formed the focus of the research reported here, feedback, questioning, and student self and peer assessment, can be described from a sociocultural perspective. Hattie and Timperley (2007) argue that feedback is among the ten most influential factors related to student achievement. Feedback is one of the six means of assistance that Tharp and Gallimore (1988) describe for assisting learners to participate successfully at the upper ends of their ZPDs. Sociocultural theory also provides a basis for the value of questioning in the development of higher mental processes. The questions that are asked of learners in their interactions with others spark the development of the questions that learners later ask of themselves in their reasoning and problem solving. Self and peer assessment is a form of formative assessment and serves two primary functions. First, engaging students in assessment of their own or a peer's work helps students monitor

their own understandings. Second, it initiates student planning and regulation of their own actions to achieve a learning goal. A premise of sociocultural theory is that responsive assistance expands the range of possibilities for learning in the ZPD. This would suggest that a goal of instruction should be to assist learners to develop the agency and skills necessary to expand their own ZPDs through such self-assessment strategies as asking questions of themselves and others, seeking resources, or seeking the assistance of more capable others.

The FAIR as a Mediating Device for Collaboration and Dialogue Focused on Learning

A common theme across the three studies was the role that the Formative Assessment and Interaction Record (FAIR) played in mediating the varied collaborative work and dialogue that occurred. The collaborations could be described as inquiry focused on formative assessment as a means to better support student learning. This collaboration occurred at multiple levels: (a) district and site administrators collaborated to develop the FAIR, which described the research-based instruction they wished to develop in the district, and which led to conversations about the need to increase the effectiveness of instruction in order to increase learning opportunities for students; (b) principals and teachers examined individual and site data on FAIR strategy use and engaged in discussion about how to more responsively meet students' individual learning needs; and (c) teachers implemented FAIR strategies in classrooms and supported student learning through dialogic instruction. Wells (2001) asserts that collaborative knowledge building and the development of

new understandings are supported by a shared focus on the development of an improvable object. The development of such an object requires participants to debate, argue, justify positions, and negotiate the problems that are inevitably encountered. In this district, the FAIR served as such an improvable object. Items for consideration had to be initially offered, considered, debated, justified, and ultimately accepted or rejected. Working together to calibrate ratings made in classroom observations led to disagreements, debates, and ultimately to greater shared understandings. In the analysis of FAIR data and the generation of focus strategies and specific performance goals, teachers and principals together explored the relationships between FAIR strategy use, student learning, and the district's goals in relation to equity in achievement. In classroom observations by principals and peer observations by teachers, discussion ensued about how better to support student learning through research-based instruction.

The first study presented the development and reliability investigation of a classroom walkthrough tool used to document teachers' use of formative assessment practices: the Formative Assessment and Interaction Record (FAIR). Rich and productive dialogue transpired among district and site administrators in the development of the FAIR and in the district-wide tri-annual classroom observations, and between site administrators and teachers in the frequent site and cross-site classroom observations by teachers of their peers and in the examination of FAIR data. The conversations were perceived as a primary benefit of the collaborations. Principals deemed the FAIR as especially helpful as a common place to begin a

dialogue. Though the FAIR and FAIR data were valued, it was the resulting dialogue that sparked new thinking and reflections on improving student learning, equity and opportunity to learn, and it was the dialogue that was perceived as the primary catalyst for changes documented by classroom observations using the FAIR. Principals expressed the view that the work might not have occurred without the FAIR as a formative tool that articulated performance targets for teachers, and allowed individual, group, and site goal setting as well as the means to monitor and assess changes in teaching. At the district level, FAIR data served as a springboard for conversations among administrators about the relationships between strategy use and providing equity in learning opportunities. At the school level, conversations occurred between teachers and principals about possible changes that could be made at the site and in the classrooms to better support student learning.

In the second study presented, documenting principals' formative use of assessment data to inform teaching practices, the dialogue among teachers that resulted from collaborative data analyses was reported as a highly valued outcome. Teachers at each school selected Language Arts and mathematics standards or concepts on which to focus and for which three assessments were administered to monitor student progress and to determine whether instructional responses had an effect on achievement. It was not the data that informed the changes that teachers made; rather, it was the collaborative dialogue that the data initiated that led to teacher reflection and planning, which in turn led to changes in instruction and to a great deal of sharing among teachers. The conversations were about what the data

implied about school programs, curricula, interventions, and student learning, taking into consideration all of the many intervening factors such as curriculum, the quality of the assessment itself, student absences, etc. Collaborative analyses of student assessment data generated the need for teacher collaboration, which in turn required discussion, negotiation, and planning, and also mitigated teachers' sense of isolation.

The final study presented demonstrated how a whole-class peer-assessment activity supported quality teacher-student dialogue characterized by authentic, high-level teacher questions, a substantial percentage of time spent in discussion, broad student participation and a mean student response length consistent with that found in dialogic instruction. If, as Mercer (2002) claims, the determining factor in the effectiveness of instruction is the quality of teacher-student dialogue, then it is important to identify activity settings that might better support such dialogue.

Peer assessment activities such as those presented in the final study are important because they do not require new curricula, training or coaching for teachers, or even a departure from district-mandated pacing, should that be the practice. Additionally, such activities are not in conflict with state and federally imposed program improvement sanctions that befall so many districts, including the district in which these studies occurred. Many forms of formative assessment, such as peer assessment, can be integrated into instruction to engage students in higher-level thinking and in rich dialogue that provides supports for students to learn, develop, and to integrate current and developing understandings.

Equity and Opportunity to Learn

A second theme across the three studies was equity and opportunity to learn. The premise of this work was that increasing teachers' use of formative assessment strategies would expand learners' opportunities to learn and result in greater equity in achievement. The concepts of equity and opportunity to learn served as the motivation for the work that comprised this dissertation. They were goals that created the purpose for conversations, the reasons for collaborative activity, and the lens for analysis of data. In addition to formative assessment, they were central constructs to each of the three studies. The definition of equity used by the district in which this work occurred came from the National Equity Project (Osta & Perrow, 2008):

Ensuring equally high outcomes for all participants; removing the predictability of success or failure that correlates with any social or cultural factor; and interrupting inequitable practices, eliminating biases, and creating inclusive, multicultural school environments. In the development of the FAIR, equity and opportunity to learn provided the rationale for engaging principals and the district English Learner Program Advisory Committee in discussions around ways to improve instruction to reduce gaps in achievement and to better scaffold instructional content for English learners. The goal of that work was to collaboratively develop a reliable tool to support district administrators and site principals in their efforts to increase teachers' use of formative assessment and equity-focused strategies.

In the study documenting principals' formative use of assessment data with the goal of increasing learning, analysis of data disaggregated by ethnic, language,

and socioeconomic groups was central to exposing inequities. Such analyses served a number of functions such as: illuminating the existence and extent of inequities, providing an impetus to make changes in instruction or to implement interventions or new programs, increasing teachers' sense of responsibility for student learning, and providing the means to monitor student progress and determine the effects of classroom, school, and district efforts to achieve equity goals.

The final study demonstrating how formative assessment can support dialogic instruction showed that teacher-student interactions in the context of a whole-class student assessment activity included authentic, high-level teacher questions, high-level teacher responsiveness, a substantial proportion of time devoted to discussion, broad participation by students, and longer student responses than what is commonly associated with teacher-student dialogue. Such dialogic instruction is associated with greater learning (Nystrand, Gamoran, Kachur & Prendergast, 1997) and therefore constituted a means to achieve equity goals in achievement. Beyond this, however, the peer assessment activity provided students with explicit instruction in thinking strategies, opportunities to apply those strategies in their reading choices, and opportunities to evaluate their own and their peers' reading logs according to criteria collaboratively generated with their teacher and peers. The teacher and students presented, defended, and negotiated their ratings of student reading logs. Students had opportunities to articulate their evaluations and to give and receive feedback. Such teacher-student interactions are central to the responsive assistance necessary to help

students to deepen their schooled understandings to a greater degree than can be accomplished in peer-only interactions or recitations (Tharp & Gallimore, 1988).

Reflections and Considerations

The three studies that comprise this dissertation each represent practical actions that can be taken in a variety of contexts to increase students' opportunities for learning. The first study reported the development of a classroom observation tool, the Formative Assessment and Interaction Record (FAIR), and demonstrated that it could be reliably used to document teachers' use of formative assessment strategies as well as to document changes in strategy use. The second study described how principals used the FAIR to engage teachers in collaborative efforts to increase use of formative assessment in their classrooms and how they used assessment data to initiate discussions about student achievement and learning, and to generate collaborative efforts to more responsively meet individual student needs. The final study demonstrated that a lesson that integrated multiple forms of formative assessment strategies, including peer assessment, questioning, and feedback, supported dialogic instruction and engaged learners in the use of high-level mental processes. Together, these studies have shown that the sociocultural perspective can be useful in describing, documenting, and analyzing formative assessment.

Not all studies on formative assessment reported in the literature have yielded positive results. This is not surprising because the research is broad, crosses many disciplines, is multidimensional, and studies often do not examine similar parameters. Though the *average* achievement results across these studies and across meta-

analyses are large, Kluger and DeNisi (1996) contend that formative assessment interventions have produced negative effects on learning in more than a third of the studies they reviewed, and that researchers are too quick to dismiss contradictory findings. Black and Dylan (1998a) disagree and maintain that, “Significant gains can be achieved by many different routes, and initiatives here are not likely to fail through neglect of delicate and subtle features” (p. 77). Kluger and DeNisi maintain that additional research on formative assessment is needed, and that research should focus on the *processes* that feedback generates, such as increasing or decreasing effort, focusing attention, or altering motivation, rather than on the complexity of individual and process factors that are emphasized in much of the research to date. The work reported here suggests that another consideration in future research on formative assessment might be the extent to which formative assessment supports dialogic exchanges between teachers and students.

According to Tharp and Gallimore (1988), students who typically find success in school do so despite the instruction that they are provided, and high quality instruction is necessary to achieve equity in education. They propose that classrooms be reorganized to support small-group dialogic instruction focused on cognitively complex content. Delpit (1995) argues, however, that neither process-based nor skills-based approaches to teaching are appropriate for educating minority-group children; rather, Delpit asserts, effective teaching must also include explicit instruction in the linguistic and behavioral practices of the majority culture. Formative assessment focused on explicit instruction in higher-order thinking

processes offers all students access to the thinking processes that are often overlooked in classrooms but which have the potential to assist students to develop the mental processes that will support their learning beyond the current learning context.

There were a number of constraints and affordances resulting from my role as a participant researcher. The primary difficulty encountered was the need to navigate teachers' preconceptions, fears, suspicions, and mistrust of district office administrators in establishing relationships, thus limiting access to some classrooms. Affordances, on the other hand, were many. There were opportunities to form new groups or committees that served the research, including an Assessment Council and an English Learner Advisory Committee. There was access to time at district office, educational services, and principal meetings that no outside researcher could possibly have accomplished. The primary affordance, however, was the ongoing opportunity to work alongside principals in the everyday workings of the district, and to understand very well the many constraints under which we worked. This understanding was important in the continuous problem solving needed to conduct the research.

Tharp and Gallimore (1988) described the "Triadic Model of Assistance" for which the primary role of all individuals within an organizational structure is to assist those they serve to better assist those that they in turn serve. In an educational system, this would imply that the primary role of district administrators is to assist principals to better assist teachers, and that the primary role of principals is to assist teachers to better assist their students. To a large extent, this model describes the work reported

in this research in terms of my role as district office administrator and researcher, supporting principals, whose role in this research was essential. They were skilled, knowledgeable, and passionate in their work to help teachers to better support the learning of students. Possibly, then, because change in education is so difficult to accomplish, and because it is even more difficult to sustain, one strategy in change research might be for researchers to consider how they can assist district administrators, principals, or teachers to better assist those they serve.

The studies reported here were valuable because they focused both on teacher development in the area of formative assessment and on principals as leaders of this work. The U.S. Department of Education asserts that the success of educational change depends on the development of effective teachers who are able to increase student achievement (2007). Starcher (2006) contends that school principals are the necessary drivers of this change. Fullan (2002) argues, however, that though leadership provides the foundation for large-scale change, sustainability will require that the role of the principal expand to include being a leader not only of change, but of continuous improvement as well. He claims that a successful principal will need to balance taking action with a host of skills including building relationships, actively participating in inquiry with staff as a co-learner, maintaining a focus on learning and instruction, creating a culture of job-embedded learning, and possessing a strong knowledge of and critical eye toward research. It is the latter skill with which researchers might usefully assist principals and other district administrators, including superintendents, who work under fast-paced and often highly volatile conditions.

There are a number of ways that this research might usefully be extended and a number of issues that remain to be explored. Bransford, Brown, and Cocking (2000) contend that a focus on classroom processes is less effective than understanding how those processes interact within specific content instruction. Therefore, future research might consider the specific application of formative assessment strategies, such as questioning, feedback, and self and peer assessment within various content areas including mathematics, science, or Language Arts.

Future research might also consider the affordances and constraints of formative assessment in different classroom organizations. Cazden (1988) has proposed that, “Educational purpose and equitable opportunity to learn remain the most important design principles. Both teachers and researchers need to monitor who participates and how, and who doesn’t and why” (p. 81). While the broad student participation described in this research occurred in a whole-class setting, most often participation in such settings is limited to a few students. As a result, the questions, concerns, knowledge, understandings, and abilities of those students who do not participate, or those who participate to a lesser extent, are understood less well by their teachers. These are often the students who are most underserved by schools: language and ethnic minority students, and students from homes of poverty (Gipps, 2002; Tharp, Estrada, Dalton, & Yamauchi, 2000). An important concept addressed in this research was that of instructional equity, which requires provision of equitable opportunities to learn, and which in turn implies equal access to a critical resource in the classroom, the teacher, and equal opportunities to appropriate the language,

knowledge, strategies, and thinking processes of more expert others in the classroom. This information is precisely that which provides the foundation for formative assessment: What students know and are able to accomplish independently, what they are able to accomplish with assistance, as well as students' questions, concerns, and understandings, form the foundation for responsive assistance. Estrada (2005) maintains that dialogue between teachers and a small number of students is crucial for two reasons that are insufficiently provided in whole-class settings: it affords the teacher access to individual students' thinking, therefore allowing accurate assessment and effective assistance; and it affords students access to the teachers' thinking processes and problem-solving strategies, which is critical for learning and development. Therefore, it is important that future research consider, as Cazden suggests, who is participating, and who is benefitting from instruction, and why.

Appendices

Appendix A

Presentation from Introductory Formative Assessment Professional

Development

Our Elementary School

Joining the "800 Club:"
Formative Assessment

Putting Our Work in Perspective

- Equity: Closing the Achievement Gap
- Opportunity to Learn: Ensuring Academic, Educational, Career, and Life Opportunities for our Students
- An Even Bigger Reason: Healthy populations (Stephen Bezrucika, MD) have:
 - Small gap between rich and poor
 - Respect for each other and see each other as equal
 - Norms of support, caring, and sharing

What is Formative Assessment?

- Read "Classroom Assessment: Minute by Minute, Day by Day."
- Complete a "Focused Reading" of the article:
 - ✓ Got it. I consistently and strategically use this in my classroom
 - ! This is really important or interesting
 - ? I'd like more information about this, or, I don't understand this

What is Formative Assessment?

- Read "Classroom Assessment: Minute by Minute, Day by Day."
- Complete a "Focused Reading" of the article:
 - ✓ Got it. I consistently and strategically use this in my classroom
 - ! This is really important or interesting
 - ? I'd like more information about this, or, I don't understand this
- With an elbow partner (or a threesome), compare your responses (✓s, !s, and ?s)

What is Formative Assessment?

Formative Assessment – Why is it Important?

- Evaluation: Which of the “Seven Strategies” are most critical for our students?
- Watch the video on Formative Assessment.
 - First, research evidence on Formative Assessment; “principles” are mentioned
 - Second, Stiggins’ Seven Principles



What is Formative Assessment?

Formative Assessment – Why is it Important?

- Complete the “School Formative Assessment Graph”.
- With a partner, discuss your ratings and rationales; come to a consensus rating for each strategy; place post-it notes appropriately on the chart paper.

What is Formative Assessment?

Formative Assessment – Before you leave...

- Complete the “My Classroom Formative Assessment Graph”.
- Please leave it on the table; we will return it to you at the end of the year so we can see if our ratings change!

THANK YOU!

Appendix B


Teacher Assessment of the Value of Formative Assessment

Value of Formative Assessment
How Important is Formative Assessment for the Children you Serve?

Extremely Important!						
Important						
Somewhat important						
Not especially important						
	Understandable goals established at the outset	Models (examples) of strong and weak work	Continuous, descriptive feedback on work products	Opportunities to incorporate feedback to improve work and understandings	Complex, compelling, challenging questions	Self-assessment, goal setting, and progress monitoring
	(1)	(2)	(3)	(4)	(5)	(6)


Appendix C

Formative Assessment Professional Development on Questioning Strategies



October 12, 2009


**Formative Assessment:
Questioning Strategies**



Expected Outcomes

I hope we leave today with:


- A better understanding of questioning strategies
- Grade-level teacher questioning goals for 2009-2010



Putting it in Perspective

Classroom Instruction that Works

- Similarities and Differences
- Summarizing and Note Taking
- Reinforcing Effort and Providing Recognition
- Homework and Practice
- Nonlinguistic Representations (graphic, models, mental images, drawings, etc.)
- Objectives and Feedback
- Generating and Testing Hypotheses
- Cues, Questions and Advance Organizers



Putting it in Perspective

Assessment for Learning

- Student-friendly targets from the beginning
- Models of strong and weak work
- Questioning Strategies
- Feedback
- Opportunities for focused revision to incorporate feedback to improve
- Student self-assessment

Putting it in Perspective

Focus on Questioning and Feedback Includes:

<p>Classroom Instruction that Works</p> <ul style="list-style-type: none"> - Similarities and Differences - Summarizing and Note Taking - Reinforcing Effort and Providing Recognition - Homework and Practice - Nonguistic Representations (graphic, models, mental images, drawings, etc.) 	<p>Assessment for Learning</p> <ul style="list-style-type: none"> - Student-friendly targets from the beginning - Models of strong and weak work
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Objectives and Feedback

- Generating and Testing Hypotheses
- Cues, Questions and Advance Organizers

Questioning Strategies

- Feedback
- Opportunities for focused revision to incorporate feedback to improve
- Student self-assessment

Assessment for Learning (1)

Two Critical Formative Assessment Strategies for Responsive Assistance

- Questioning
- Feedback
 - Teacher descriptive feedback
 - Student self-assessment

Assessment for Learning (1)

Two Critical Formative Assessment Strategies for Responsive Assistance

- Questioning
- Feedback
 - Teacher descriptive feedback
 - Student self-assessment

Questioning Strategies

- ACTIVITY 1: With a partner, discuss:
 - What you think a questioning strategy might be.
 - How a questioning strategy is different from a question?
 - What might be some goals of questioning strategies?
 - Whether all strategies are appropriate for all learners (consider different ages, different ability levels, different background knowledge, different language ability, etc.)?
 - What might be some reasons that questioning strategies are so important in learning?

Rationale

The questions that we ask our students:

- Guide their attention to what is most critical for learning
- Model the questions that we ask ourselves to assist our own learning
- Make our thinking and problem solving processes 'visible' to learners

The questions that we ask learners today become the questions they ask themselves tomorrow. *"Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime."*

Questioning Strategy Research

- Research¹ on higher-level questions shows that they enhance:
 - learning,
 - retention,
 - transfer,
 - interest, and
 - the development of more effective learning strategies

¹ (Black & Wilson, 1996; Bransford, Brown, & Cocking, 2000; Crooks, 1988; Harle & Tierney, 2007; Klager & DeNisi, 1996; Moran, 2004; Nardiello, 1987; Sluts, 2008)

Questioning Strategy Research

- A research review from NWREL¹ states:
 - Higher cognitive questions are not always better than lower cognitive questions in eliciting higher-level responses or in promoting learning
 - Simply asking higher cognitive questions does not necessarily lead students to produce higher cognitive responses
 - Teaching students to draw inferences and giving them practice in doing so results in higher cognitive responses and greater learning gains

¹ Northwest Regional Educational Laboratory, <http://www.nwrel.org>

Some Questioning Taxonomies

Taxonomies and Questioning Systems

Bloom's Taxonomy	
Knowledge	Define, recall, explain, summarize
Comprehension	Describe, compare, contrast
Application	Classify, use, identify, solve
Analysis	Identify, analyze, draw conclusions, compare/contrast
Synthesis	Plan, produce, design, create
Evaluation	Judge, argue, defend, choose

Klages & Higgins Six Levels of Understanding	
Learn	Learn the
Explain	Provide message, supports, and justify answers (synthesize, test, analyze)
Infer	Use meaningful details to infer generalizations, provide sound support or defend conclusions (analyze and compare, make inferences/relationships, evaluate through images, analysis, synthesis, and recall)
Apply	Identify use and adapt what you know to solve problems
Remember	Use words or non-verbal symbols, copy and write, use handwriting
Organize	Provide or establish right (recall, plan, or organize) precise details of the field of study (recall, organize)
Self-knowledge	Provide the personal goals, objectives, purposes, and habits and/or that are unique and diverse and a core understanding. Use resources in other and own self-empowerment, if able understanding, focus, and of focus, energy, or attention

More Questioning Taxonomies

- Habits of Mind (listening with understanding, applying prior knowledge to new situations, etc.)
- Reciprocal Teaching (summarizing, questioning, clarifying, predicting)
- Cognitively Guided Instruction (prior knowledge, connections, inquiry, problem solving, etc.)
- Modes of Mathematical Cognition (inference, abstraction, logical analysis, modeling, etc.)
- Six Modes of Mathematical Reasoning (explanation, elaboration, justification, etc.)
- Reading Strategies (prior knowledge, connections, predicting, questioning, etc.)

Grade-Level Questioning Strategies

- With your grade-level partners, rank the "Bloom's" and "Facets" questioning strategies 3 ways:
 - "Easiest" to "Hardest"
 - "Most Familiar" to our students to "Least Familiar"
 - "Most Important" for our students to learn to "Least Important"
- Now, select the two strategies you would like to work on together to incorporate into your instruction, list different contexts in which you might use these questions, and generate as many sample questions as you can.

Questioning Analysis

- In most research, questions are categorized into two levels
 - High Cognitive Demand
 - Reasoning (higher-order cognitive processes such as analysis, warranted opinion, explanation, synthesis, prediction, inference, perspective taking, empathy, hypothesizing, etc.), or
 - Reflection (e.g. reflect on learning, generalization).
 - Low Cognitive Demand
 - Recall (of known information), or
 - Position Taking (unfounded opinion or speculation);

Did we achieve our expected outcomes?

Are you leaving today with:

- A better understanding of questioning strategies?
- Two grade-level teacher questioning goals for 2009-2010?

Remember:
You ask great questions every day!!

Professional Development Activity: Ranking Questioning Strategies

OCTOBER 12, 2009

ACTIVITY 2

RANKING QUESTIONING STRATEGIES

Taxonomies and Questioning Systems

Bloom's Taxonomy

Knowledge	Define, recall, recognize, remember
Comprehension	Describe, compare, contrast
Application	Classify, use, choose, solve
Analysis	Identify causes, draw conclusions, determine evidence
Synthesis	Predict, produce, design, develop
Evaluation	Judge, argue, decide, assess

McTighe & Wiggins Six Facets of Understanding

Learner can...	
Explain	Provide thorough, supported, and justifiable accounts of phenomena, facts, and data
Interpret	Tell meaningful stories; offer apt translations; provide reveal historical or personal dimension of ideas and events; make them personal or accessible through images, anecdotes, analogies, and models
Apply	Effectively use and adapt what one knows in diverse contexts
Perspective	See points of view through critical eyes and ears; see the big picture
Empathize	Find value in what others might find odd, alien, or implausible; perceive sensitively on the basis of prior direct experience
Self-Knowledge	Perceive the personal style, prejudices, projections and habits of mind that both shape and impede one's own understanding. One is aware of what one does not understand, of why understanding is hard, and of how one comes to understand

Using the two Questioning Taxonomies (Bloom's and Facets), rank the 12 strategies from:

Easiest to Hardest for our students

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.

Least Familiar to Most Familiar to our students

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.

Least Important to Most Important for our students

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.

Which TWO would your team like to focus on for 2009-2010?

Focal Questioning Strategy	Reason
1.	
2.	

Appendix D

Formative Assessment Professional Development on Feedback

Our Elementary School Feedback in Mathematics

Joining the "800 Club:"
Formative Assessment

Refresher (it's been a month!)

Formative Assessment (last month)

- Article: Classroom Assessment: Minute by Minute, Day by Day (Leahy, Lyon, Thompson, and Willam)
 - Clarifying intentions and criteria for success
 - Questioning (and discussions)
 - Feedback
 - Self assessment
 - Peer assessment
- Stiggins Video
 - Student-friendly targets from the beginning
 - Model of strong and weak work
 - Continuous descriptive feedback
 - Teach focused revision
 - Self-assessment and goal setting
 - Self-reflection to track growth
 - Teach one tool at a time

Feedback in Mathematics

Feedback is an inherent aspect of ANY formative assessment

- Feedback can come from:
 - Teacher
 - Peer
 - Self
 - A text (such as the answers in the back of the book)
 - The Internet
 - A computer program
- Through various means such as:
 - Questioning
 - Marking or commenting on performance or products
 - Checklists or rubrics
 - Informal observations
 - Computer assisted instruction
 - Providing hints, cues (winks, stares, raised eyebrows, etc.), analogies, explanations or examples
 - Tests or quizzes

ACTIVITY

- On your own:
 - Use the T-Chart handout to list
 - Several ways that you provide feedback to your students IN MATH, and
 - How you provide opportunities for students to incorporate that feedback to improve their abilities and understandings

Example of Feedback in Math: Video

ACTIVITY

- Whole Group Share:
 - What feedback artifacts did you bring to share?
- With your grade-level team:
 - Share two ways you provide feedback and two ways you provide opportunities for students to learn from that feedback
 - Generate three "next steps" for your grade level to improve feedback in math and to structure opportunities for students to apply the feedback to improve
 - Prepare to share your three next steps

For our next meeting

- We will focus on oral and written descriptive feedback
- Bring TWO examples of student work with your written feedback on it

Appendix E

Formative Assessment Professional Development on Writing Rubrics

WRITING RUBRICS

JANUARY 19, 2010

- I (10 min.) On your own, briefly review the *Feedback Attributes* and then, with a partner, share the “feedback attribute” that you selected to focus on for the past two months, how you’ve integrated it into your instruction, and the impact you observed it have on your students.
- II (15 min.) *Three-Step Interview (and Scaffolded Verbal Response: Write before talking)*: With your partner, examine your student writing samples. Use two post-its of different colors to list student “strengths” and “struggles.”
- A. (Step 1) One partner will interview the other, asking the questions below. The interviewer listens. When responses are completed, partners can discuss the samples.
- B. (Step 2) Reverse roles.
- C. (Step 3) Find another pair to form a group of four. Each person introduces their partner and shares the shared analysis of the student writing and how the partner provides writing feedback.
- Interview Questions:**
1. What are some strengths you observe in students’ writing?
 2. What are some gaps or weaknesses?
 3. How do you communicate students’ writing strengths and weaknesses to them (feedback)?
- III (5 min.) Milani Teacher Brilliance: Sixth Grade Writing Feedback through Self and Peer Assessment
- IV (5 min.) Examine the *Writing Rubric Resource Packet*. Use a highlighter to identify anything that might be of future use to your rubric development.
- V (15 min.) *Grade-Level Rubric Development*
Using the writing resources provided:
- Create or edit your rubric to make it as *student-friendly*, informative, and thorough as possible (is there anything you can take from the resources?).
 - Discuss ways to help your students become proficient in assessing their writing. List your ideas here:

Ways to help students become more proficient at self-assessment:

- VI (10 min.) Each grade-level selects two ideas to share with the group.

Appendix F

Teacher Formative Assessment Self-Reflection

Name: _____

My Classroom Formative Assessment Graph

How “Immersed” is your classroom in Formative Assessment?

(For each of the formative assessment strategies, place an X next to the degree to which it is integrated in your classroom. Write a brief explanation of your rating next to each X.)

I consistently and strategically do this!						
I do this sometimes.						
I try but I'm not great at it yet.						
I typically do not do this						
"X" to mark where you are at now; Place a DOT for where you think you were last year.	"X" to mark where you are at now; Place a DOT for where you think you were last year.	"X" to mark where you are at now; Place a DOT for where you think you were last year.	"X" to mark where you are at now; Place a DOT for where you think you were last year.	"X" to mark where you are at now; Place a DOT for where you think you were last year.	"X" to mark where you are at now; Place a DOT for where you think you were last year.	"X" to mark where you are at now; Place a DOT for where you think you were last year.
All students engage in self-assessment and are helped to set goals and monitor their progress	All students are guided to engage in higher-order reasoning through questioning	All students receive continuous, descriptive feedback on their work.	All students have opportunities to incorporate feedback to improve their work (focused revision)	All students are provided student friendly targets from the beginning	All students are provided models (examples) of strong and weak work.	

Appendix G

FAIR Walkthrough

FAIR WALKTHROUGH FORMATIVE ASSESSMENT AND INTERACTION RECORD

Teacher Name: _____	Topic/Content _____
Time: from _____ to _____ Date: _____	Grade _____ Number Students: _____
<input type="checkbox"/> Teacher-Led Instruction	<input type="checkbox"/> Student Work, Practice, or Application
Classroom Organization/Strategies	Student Engagement
<input type="checkbox"/> Consistent, predictable routines	<input type="checkbox"/> Ss are actively engaged (1 - 5) ¹ : ____ (talking, writing, moving, doing; not just listening or watching)
<input type="checkbox"/> Small-Group Instructional Conversations (teacher-led small group, focused on higher-order concepts or themes, using a graphic organizer)	<input type="checkbox"/> Oral language development through structured student responses (e.g. sentence frames, poetry, song, chant, drama, signal words)
<input type="checkbox"/> Repeated presentation of key information using visual cues, pictures, realia (real world objects) or physical gestures	<input type="checkbox"/> Ss are engaged (1 - 5) ² : ____ (attentive, motivated)
<input type="checkbox"/> Physical gestures, modeling, or visual supports (e.g., anchor chart) are used to make content comprehensible	<input type="checkbox"/> *Ss assess their work (or a peer's) using rubrics, checklists, answer keys, or guides
<input type="checkbox"/> Graphic organizers (e.g., t-charts, Venn diagrams, inquiry charts, cognitive content dictionary) are used	<input type="checkbox"/> *Ss set goals and monitor their progress
<input type="checkbox"/> Thinking processes or comprehension monitoring are taught or modeled by teacher or students (e.g. <i>Think Alouds</i>)	<input type="checkbox"/> Ss communicate in complete sentences
<input type="checkbox"/> Writing is edited and discussed	<input type="checkbox"/> Ss ask questions when they do not understand
<input type="checkbox"/> Comprehension strategies (summarizing, predicting, visualizing, asking and answering questions, cause and effect, connecting to prior knowledge)	<input type="checkbox"/> Ss have opportunities for self-direction or choice
<input type="checkbox"/> Letters, difficult words , or text passages are highlighted, previewed, and discussed	<input type="checkbox"/> Interactive strategies (partner, team, or cooperative small-group work; pair-share; choral response; white boards) are used to increase structured student talk
	<input type="checkbox"/> Inquiry : Ss' questions drive instruction and guide their learning; (e.g. KWL, generating and testing hypotheses)
	<input type="checkbox"/> Each S talks or writes 50% of time (pairs or small groups, not whole class, choral, or chant)
Feedback Cycle	Questioning: Oral or Written (1 - 3)³: ____
During individual or group work:	<input type="checkbox"/> *Elicit relevant personal experience or prior knowledge
<input type="checkbox"/> *T observes and monitors students at work	<input type="checkbox"/> *Request summaries or paraphrasing
<input type="checkbox"/> *T examines student work	<input type="checkbox"/> *Elicit explanations, elaborations, clarifications, rationales, or justifications
<input type="checkbox"/> *Ss receive feedback on quality or accuracy of student work (clear, descriptive)	<input type="checkbox"/> *Guide reflection on understandings, performance, process, or strategy use
<input type="checkbox"/> *Ss incorporate feedback to improve their work or understandings	<input type="checkbox"/> *Ask higher-order questions (e.g. analysis, interpretation, perspective taking, synthesis, inference, synthesis, evaluation, application, generalization, prediction, simulation & difference)
During whole class or whole group work:	
<input type="checkbox"/> *T provides feedback orally during class discussion or whole-class instruction.	
Classroom Environment	<input type="checkbox"/> *Ss articulate clearly defined learning objectives
<input type="checkbox"/> Classroom climate is positive and characterized by respect for students' backgrounds, support, hard work, challenge, collaboration, and fairness	<input type="checkbox"/> * Mastery learning (opportunities for multiple attempts to achieve mastery criteria)
<input type="checkbox"/> *Standards in student-friendly language are posted	<input type="checkbox"/> * Rubrics or anchor student work posted and

Appendix H: District FAIR Walkthrough Snapshots 1, 2 & 3, 2010-11

Formative Assessment	SS1	SS2	SS3
Ss assess their work (or a peer's) using rubrics, checklists, answer keys, or guides	22%	15%	56%
Ss set goals and monitor their progress		9%	22%
Feedback during group or individual work:			
T observes and monitors students at work	50%	58%	80%
T examines student work	28%	43%	67%
Ss receive feedback on quality or accuracy of student work (clear, descriptive)	33%	40%	60%
Ss incorporate feedback to improve their work or understandings	25%	33%	60%
Feedback during whole class or whole group work: T provides feedback orally during class discussion or whole-class instruction.	67%	63%	84%
Questioning: Elicit relevant personal experience or prior knowledge	33%	56%	48%
Questioning: Ask higher-order questions (e.g. analysis, interpretation, perspective-taking, empathy, inference, synthesis, evaluation, application, generalization, summaries, paraphrasings, explanations, justifications, clarifications, rationales)	44%	81%	74%
Questioning: Guide reflection on understandings, performance, process, or strategy use	25%	28%	56%
Standards in student friendly language are posted	14%	23%	26%
Ss articulate clearly defined learning objectives	14%	19%	59%
Mastery learning (multiple attempts to achieve mastery criteria)	25%	19%	26%
Rubrics or anchor student work posted and referenced	3%	4%	35%

Equity: Student Engagement

Ss are actively engaged (beyond listening and watching; talking, writing, or doing)	3.1	3.4	4.0
Oral language development through structured student responses (e.g. sentence frames, poetry, song, chant, drama)	19%	33%	29%
Ss communicate in complete sentences	19%	59%	52%
Ss have self-direction or choice	--	--	24%
Interactive strategies (pair-shares, white boards, choral response, cooperative group work)	42%	58%	73%
Inquiry (Ss' questions drive instruction and guide their learning; e.g., KWL, generating and testing hypotheses)	6%	9%	16%
Each S talks or writes 50% of time (pairs or small groups; not whole class, choral, or chant)	25%	50%	41%
Ss ask questions when they don't understand	39%	49%	37%
Consistent, predictable routines	78%	89%	98%
Small-Group Instructional Conversations (teacher-led small group, focused on higher-order concepts or themes, using a graphic organizer)	14%	22%	22%
Repeated presentation of key information using visual cues, pictures, realia (real world objects) or physical gestures	44%	44%	53%
Physical gestures, modeling, or visual supports (e.g., projector) are used to make content comprehensible	69%	59%	81%
Graphic organizers (e.g., t-charts, Venn diagrams, inquiry charts, cognitive content dictionary) are used in instruction	39%	50%	47%
Thinking processes or comprehension monitoring are taught or modeled (e.g. Think Alouds)	39%	25%	37%
Comprehension strategies (summarizing, predicting, visualizing, asking and answering questions, cause and effect, connecting to prior knowledge)	22%	53%	59%
Letters, difficult words or text passages are highlighted, previewed, or discussed	33%	48%	80%
Writing is edited and discussed	6%	14%	43%

Equity: Classroom Environment

Classroom climate is positive and characterized by respect for students' backgrounds, support, hard work, challenge, collaboration, equity, and fairness	92%	90%	95%
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Appendix I: Site FAIR Walkthrough Snapshots 1, 2 & 3, 2010-11

Formative Assessment	SS1	SS2	SS3
Ss assess their work (or a peer's) using rubrics, checklists, answer keys, or guides	35%	25%	43%
Ss set goals and monitor their progress		8%	14%
Feedback during group or individual work:			
T observes and monitors students at work	50%	83%	67%
T examines student work	44%	75%	57%
Ss receive feedback on quality or accuracy of student work (clear, descriptive)	35%	67%	43%
Ss incorporate feedback to improve their work or understandings	29%	67%	43%
Feedback during whole class or discussion: T provides feedback orally during class discussion or whole-class instruction.	77%	75%	71%
Questioning: Elicit relevant personal experience or prior knowledge	38%	25%	29%
Questioning: Ask higher-order questions (e.g. analysis, interpretation, perspective-taking, empathy, inference , synthesis, evaluation, application, generalization, summaries, paraphrasings, explanations, justifications, clarifications, rationales)	53%	50%	52%
Questioning: Guide reflection on understandings, performance, process, or strategy use	12%	33%	24%
Standards in student friendly language are posted	18%	33%	19%
Ss articulate clearly defined learning objectives	27%	25%	48%
Mastery learning (multiple attempts to achieve mastery criteria)	0%	0%	5%
Rubrics or anchor student work posted and referenced	6%	33%	5%
Equity: Interaction and Student Engagement			
Ss are actively engaged (beyond listening and watching; talking, writing, or doing)	3.7	4.2	3.8
Oral language development through structured student responses (e.g. sentence frames, poetry, song, chant, drama)	12%	33%	5%
Ss communicate in complete sentences	6%	42%	33%
Ss have self-direction or choice	--	17%	1%
Interactive strategies (pair-shares, white boards, choral response, cooperative group work)	44%	50%	57%
Inquiry (Ss' questions drive instruction and guide their learning, e.g., KWL, generating and testing hypotheses)	3%	8%	0%
Each S talks 50% of time (pairs or small groups, not whole class, choral, or chant)	15%	50%	24%
Ss ask questions when they don't understand	29%	17%	19%
Consistent, predictable routines	94%	100%	95%
Small-Group Instructional Conversations (teacher-led small group, focused on higher-order concepts or themes, using a graphic organizer)	3%	0%	0%
Repeated presentation of key information using visual cues, pictures, realia (real world objects) or physical gestures	29%	33%	19%
Physical gestures, modeling, or visual supports (e.g., projector) are used to make content comprehensible	35%	67%	67%
Graphic organizers (e.g., t-charts, Venn diagrams, inquiry charts, cognitive content dictionary) are used in instruction	41%	33%	24%
Thinking processes or comprehension monitoring are taught or modeled (e.g. <i>Think Alouds</i>)	9%	17%	10%
Comprehension strategies (summarizing, predicting, visualizing, asking and answering questions, cause and effect, connecting to prior knowledge)	15%	17%	43%
Letters, difficult words or text passages are highlighted, previewed, or discussed	41%	58%	67%
Writing is edited and discussed	15%	33%	24%
Equity: Classroom Environment			
Classroom climate is positive and characterized by respect for students' backgrounds, support, hard work, challenge, collaboration, equity, and fairness	94%	100%	90%

Appendix J
Formative Assessment, Equity, and Opportunity to Learn

Principal Interview Protocol

Definition of Equity from the National Equity Project and 2010 MLA:

- a. Ensuring equally high outcomes for all participants in our educational system.
- b. Removing the predictability of success or failure that correlates with any social or cultural factor.
- c. Interrupting inequitable practices, eliminating biases, and creating inclusive multiracial school environments for adults and children.

EQUITY AND OPPORTUNITY TO LEARN

1. Describe your experience at the management retreat on equity and opportunity to learn? What did we do? How did that work resonate with your beliefs and values?
2. What have you done this year to increase equity at your school?

DATA TO INFORM INSTRUCTION

3. Describe the work you have done with your staff over the last two years regarding use of data to inform instruction.
4. In what ways is this work related to our equity goal and equity work?

IMPROVING INSTRUCTION: FAIR Walkthrough Data

5. Describe your participation in the development of the walkthrough protocol.
6. Describe how the walkthrough has been used at your site to improve the quality of instruction at your school.
7. Have you seen any changes in teaching or learning that may have resulted from your site work with the walkthrough?
8. Have teachers at your site used the walkthrough to observe their colleagues? If so, please describe. What comments have teachers made about observing their colleagues? In what ways do you think peer observations might be of benefit?
9. Is the walkthrough a useful tool to support your leadership efforts? Toward what goals and in what ways?

10. Describe any changes that may have occurred this year at your site as a result of the walkthrough. In what ways?
11. Describe some typical teacher reactions to the walkthrough protocol and observations.
12. Do you have suggestions for improving our work on formative assessment in our district?

Site-Based Initiatives

13. Describe other initiatives at your site this year that you feel will impact your site positively or negatively on the CSTs.

Appendix K

Sample

Grade 3, Partial Distractor Report

Item 12 [*similar information is available for each assessment item*]

Which of the following is true?

A. $1,825 = 1,830$ B. $1,825 > 1,830$

C. $1,830 < 1,825$ D. $1,830 > 1,825$

Standard AF 1.1

Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities.

Response A

Selected by 0 students

Student(s) may have thought that rounding would be appropriate in this case and therefore assumed $1,825 = 1,830$.

Response B

Selected by 3 students [*teacher can click a button to see which students chose response B*]

Student(s) may have misunderstood inequality symbols and thought that the sign points at the larger number.

Response C

Selected by 2 students [*teacher can click a button to see which students chose response C*]

Student(s) may have misunderstood inequality symbols and thought that the sign points at the larger number.

Response D

Correct answer

80.8 %

Appendix L

Sample CST Worksheet¹

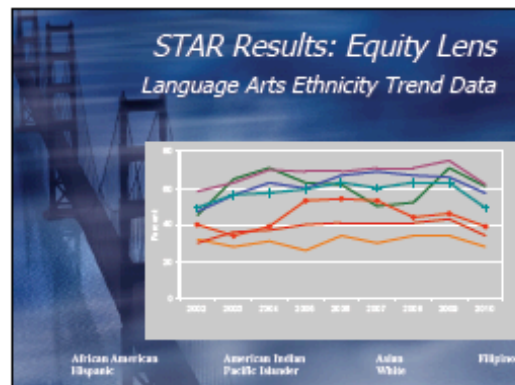
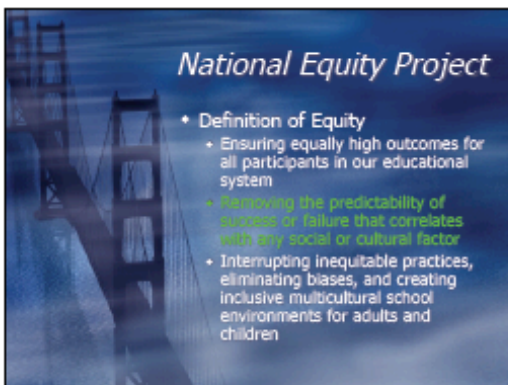
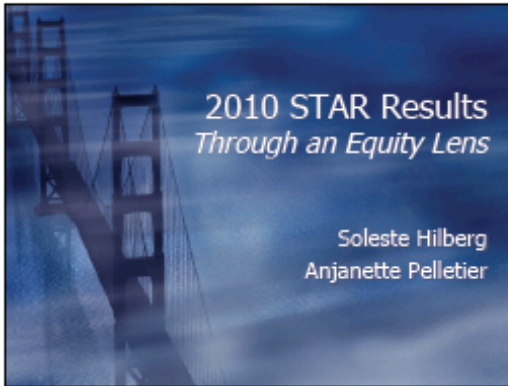
DISTRICT Elementary Analysis Worksheet 2010 CST Mathematics Standards Tests

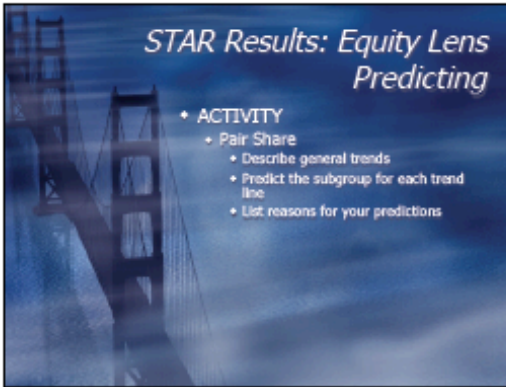
Grade	Reporting Cluster	#	Avg % Correct Statewide		Mean % Correct	State Average + / -	Minimally Proficient + / -
			State Average	Minimally Proficient			
Grade 2							
	Place Value, Addition, and Subtraction	15	75	74	73	-2	-1
	Multiplication, Division, and Fractions	23	78	77	77	-1	0
	Algebra and Functions	6	76	73	74	-2	1
	Measurement and Geometry	14	78	76	75	-3	-1
	Statistics, Data Analysis, and Probability	7	76	73	73	-3	0
Grade 3							
	Place Value, Fractions, and Decimals	16	78	74	74	-4	0
	Addition, Subtraction, Multiplication, Division	16	75	70	72	-3	2
	Algebra and Functions	12	74	68	72	-2	4
	Measurement and Geometry	16	82	79	79	-3	0
	Statistics, Data Analysis, and Probability	5	84	83	82	-2	-1
Grade 4							
	Decimals, Fractions, and Negative Numbers	17	82	79	81	-1	2
	Operations and Factoring	14	76	69	74	-2	5
	Algebra and Functions	18	83	83	81	-2	-2
	Measurement and Geometry	12	70	60	70	0	10
	Statistics, Data Analysis, and Probability	4	78	72	77	-1	5
Grade 5							
	Estimation, Percents, and Factoring	12	67	60	61	-6	1
	Operations with Fractions and Decimals	17	67	61	62	-5	1
	Algebra and Functions	17	71	67	66	-5	-1
	Measurement and Geometry	15	64	57	56	-8	-1
	Statistics, Data Analysis, and Probability	4	83	85	79	-4	-6
Grade 6							
	Ratios, Proportions, Percentages, Negative Fractions	15	64	63	62	-2	-1
	Operations and Problem Solving with Fractions	10	70	72	68	-2	-4
	Algebra and Functions	19	70	72	69	-1	-3
	Measurement and Geometry	10	61	59	59	-2	0
	Statistics, Data Analysis, and Probability	11	61	61	60	-1	-1

¹ CST Worksheets are generated for every grade level or content area, both district wide and for each individual site.

Appendix M

District Management Retreat Summer 2010





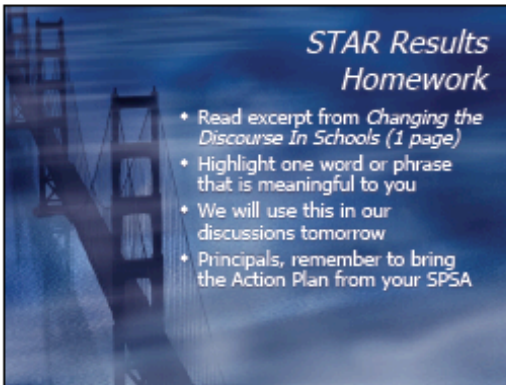
STAR Results: Equity Lens Predicting

- ♦ ACTIVITY
 - Pair Share
 - Describe general trends
 - Predict the subgroup for each trend line
 - List reasons for your predictions



STAR Results: Equity Lens Predicting

- ♦ ACTIVITY
 - Pair Share
 - Describe general trends
 - Predict subgroups
 - List reasons for predictions
 - Pair Square
 - Share trends, predictions, reasons
 - Compare to the labeled graphs
 - Equity Reflections: Our visions of equity



STAR Results Homework

- ♦ Read excerpt from *Changing the Discourse In Schools* (1 page)
- ♦ Highlight one word or phrase that is meaningful to you
- ♦ We will use this in our discussions tomorrow
- ♦ Principals, remember to bring the Action Plan from your SPSA



Thank you!



Equity

- ♦ Objectives
 - ♦ Create a definition and vision for equity in NUSD
 - ♦ Brainstorm some initial equity goals



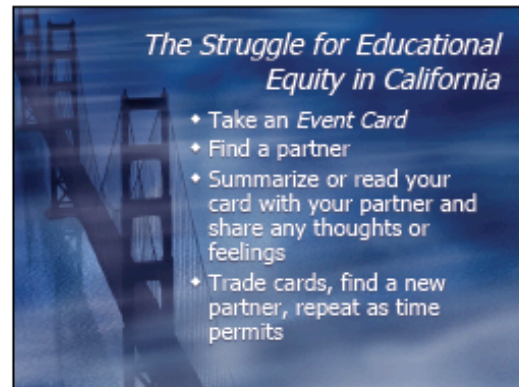
Equity Reflections

- ♦ Review of reflection post-its



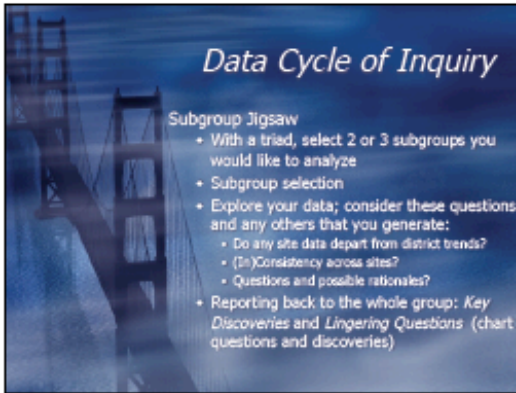
Changing the Discourse In Schools

- ♦ With your table partners, share your word or phrase from the article and any brief comments
- ♦ Make sure everyone has a turn within 5 minutes



The Struggle for Educational Equity in California

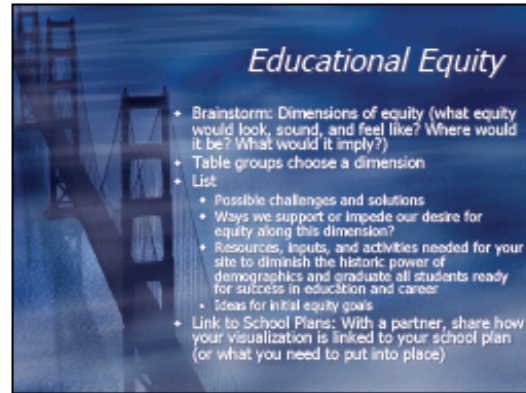
- ♦ Take an *Event Card*
- ♦ Find a partner
- ♦ Summarize or read your card with your partner and share any thoughts or feelings
- ♦ Trade cards, find a new partner, repeat as time permits



Data Cycle of Inquiry

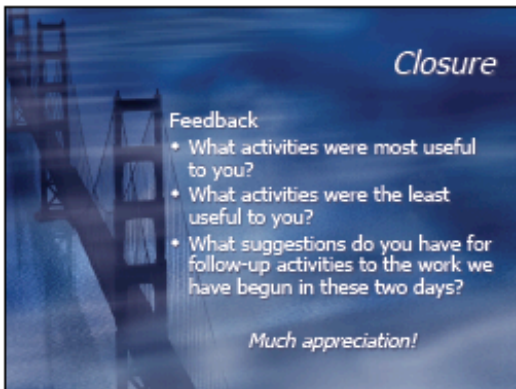
Subgroup Jigsaw

- With a triad, select 2 or 3 subgroups you would like to analyze
- Subgroup selection
- Explore your data; consider these questions and any others that you generate:
 - Do any site data depart from district trends?
 - (If) Consistency across sites?
 - Questions and possible rationales?
- Reporting back to the whole group: *Key Discoveries and Lingering Questions* (chart questions and discoveries)



Educational Equity

- Brainstorm: Dimensions of equity (what equity would look, sound, and feel like? Where would it be? What would it imply?)
- Table groups choose a dimension
- List
 - Possible challenges and solutions
 - Ways we support or impede our desire for equity along this dimension?
 - Resources, inputs, and activities needed for your site to diminish the historic power of demographics and ensure all students ready for success in education and career
 - Ideas for initial equity goals
- Link to School Plans: With a partner, share how your visualization is linked to your school plan (or what you need to put into place)



Closure

Feedback

- What activities were most useful to you?
- What activities were the least useful to you?
- What suggestions do you have for follow-up activities to the work we have begun in these two days?

Much appreciation!

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