LEGITIMATE PERIPHERAL PARTICIPATION: MATHEMATICAL LEARNING IN A FIFTH-GRADE CLASSROOM[1]

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The purpose of this research is to explore the concept of mathematics learning as participation in the context of schools. We use the dimensions of learning from communities of practice to broaden our vision of learning within schools. Our research is a year-long qualitative study in one fifth-grade classroom in an urban elementary school in United States, in a low income Latino neighbourhood. To collect the data we use ethnographic tools and an analysis based on grounded theory. In this community of practice some of the "lessons" students learn are to participate in 1) a community that is collaborative and uses diversity as a resource; 2) a negotiation of mathematical meanings to read and write their world; 3) a transformation of their identities as critical Latino/a citizens and active learners; and 4) a transformative practice guided by a vision of the roles of critical citizens in a democratic society.

INTRODUCTION

Our concepts of education and learning need urgent attention in order to address inequities in which mathematics instruction regrettably plays a leading role. A market driven education continues to deny full access to many students, especially minoritized students. Two standard approaches to education are: "transmission of knowledge from others [and] acquisition or discovery of knowledge by oneself" (Rogoff, 1994, p. 209). These approaches are embraced by various educational models that, although diverse, share a failure to address the systematic exclusion of students from minoritized communities.

In contrast to those perspectives that focus on the individual are the socio-historical frameworks of learning that consider the political, social, and historical milieu of the experiences as well as the situated and distributed nature of learning (Brown, Collins, & Duguid, 1989; Hutchins, 1993; Lave & Wegner, 1991). As Rogoff (1994) writes, "learning and development occur as people participate in the sociocultural activities of their communities" (p. 209). These views consider the agency of the individual in interaction with his or her socio-cultural context. In this particular analysis we use the theory of legitimate peripheral participation (LPP) which considers the participation of the whole individual in interaction with the world.

These concepts related to learning as participation were developed and are still used at the peripheries of learning within classrooms. In this analysis we argue that mathematical learning within classrooms can be better understood through these lenses. Within the theoretical approach of LPP, we explore the learning dimensions of practice, community, meanings, and identities (Wenger, 1998). To explain this analytical perspective, we discuss one mathematics investigation on probability in a fifth-grade classroom in a predominantly Latino community. We contend that in this community of practice some of the "lessons" students learn are to participate in 1) a *community* that is collaborative and uses

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diversity as a resource; 2) the *negotiation* of mathematical *meanings* to read and write their world; 3) the transformation of students' *identities* as critical Latino/a citizens and active learners; and 4) a transformative *practice* guided by a vision of the roles of critical citizens and a democratic society. As a note of caution is important to state that we only separate these dimensions of learning for the analysis, however, in practice they are intrinsically related and occur synchronously. Through this research, we hope to contribute to the work of scholars dedicated to improve the education for all students.

THEORETICAL FRAMEWORK

Numerous educational researchers focus their efforts in overcoming the "encapsulation" of school learning (Brown, Collins, & Duguid, 1989; Engestrom, 1991). The school system is known to reproduce knowledge that is inert and gets lost within the walls of the classrooms before it can ever become meaningful in the lives of students. In this manner the system has an alienating effect on many students and reproduces unequal power structures. This knowledge becomes especially irrelevant to students whose communities' funds of knowledge (González, Andrade, Civil, & Moll, 2001; Moll & González, 2004; Moll & Greenberg, 1990) and perspectives are systematically ignored within the curriculum and school system. This exclusion is one of the factors that make students from minoritized communities, including Latinas/os, to systematically face an uphill battle to receive equal educational opportunities.

The particular focus of this research is within the area of mathematics education. Scholars note this academic area contributes to perpetuating inequalities among minoritized communities. For example, Latina/o children are more likely to receive lower grades and discontinue mathematics courses earlier than other students (Schoenfeld, 2002); they tend to receive a curriculum that emphasizes basic skills and not higher order thinking (Secada, 1992); and they frequently contend with inequitable opportunities related to poverty level, lack of adequate school resources, and lower level teaching such as remedial teaching or teaching to the test (Hart, 2003; NCTM, 1998). Furthermore, the educational rhetoric often defines this cohort of students and families as 'at risk' or disadvantaged. The system places them 'at risk' based on their cultural and ethnic identity, based on deficit perceptions of them and their families, without consideration of the individual abilities or talents they may have (Nieto, 1999; Valencia & Black, 2002). These indicators point to the unequal educational opportunities Latina/o students experience and that counter the goals of a democratic and just society.

In the past decades some social theorists took a fresh look at learning within diverse contexts, in particular in those settings in which learning is a consequence of the participation and not an explicit goal. For instance, Lave (1988) observed adults in their daily lives at the supermarket and cooking for a new dieting program, and Lave & Wenger (1991) analysed the apprenticeship of Yucatec Mayan midwives in Mexico, Vai and Gola tailors in Liberia, U.S. Navy quartermasters, butchers in U.S. supermarkets, and nondrinking alcoholics in Alcoholics Anonymous. Observations of learning experiences outside of the official learning sites challenge a traditional understanding of learning which describes learning as the construction, internalization, or transmission of knowledge (Abreu, 2002; Carraher, Carraher, & Schliemann, 1985; Lave, 1988; Lave, 1996; Masingila, 1994; Masingila, Davidenko, & Prus-Wisniowska, 1996; Nunes, 1993). Based on these observations, learning is now defined as participation.

The school setting, however, houses a historical practice that has been organized by assumptions about learning that differ from the theory of learning as participation. As Wenger (1998) introduces his book on communities of practice, the educational institutions address learning based on the assumptions that it is an individual endeavour, is finite and linear, is best if it is decontextualized, and is the result of teaching. All these assumptions are contested by the theory of learning as participation. This contradiction suggests that in order to improve the learning opportunities within classrooms, especially for those students who are systematically underserved, we need to look into these learning experiences with new lenses. The use of the lenses of LPP and communities of practice (Lave & Wenger, 1991; Wenger, 1998) allows one to consider central aspects of the learning experiences within classrooms that are commonly overlooked. This analysis must include a socio-historical perspective and address racist views and biases that permeate the structures of the educational system. However, the practice of schooling—or learning within the classroom—has been purposefully set aside during and for the development of this theory. As a consequence, the conceptualization of the learning possibilities within the classroom, through the lens of this theory, is still emerging.

The concept of community of practice is central to this social theory of learning. We use this term based on Lave and Wegner's (1991) development of the theory of LPP who state that communities of practice, "imply participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities" (p. 98). The purpose of this theory is to describe the different ways groups of individuals who co-participate in a practice, interact with each other, and as a result learn. Both terms, 'community' and 'practice,' are commonly used in our colloquial language in diverse ways. Furthermore, within the academic realm this term has also been used with different connotations, sometimes with contradictory meanings. The definition of Lave and Wegner (1991) and Wegner (1998) does not necessarily describe collaborative or democratic settings. These researchers clarify the term does not even require co-presence, a well-defined group or visible social boundaries. They define it as "a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice" (p. 98). Communities of practice are a key focus because they are sites of significant learning. At the same time, this concept broadens our possibilities to understand learning possibilities as well as its definition. According to Wegner (1998) learning should use,

> inventive ways of engaging students in meaningful practices, of providing access to resources that enhance their participation, of opening their horizons so they can put themselves on learning trajectories they can identify with, and of involving them in actions, discussions, and reflections that make a difference to the communities that they value. (p. 10)

In this definition one can recognize the four dimensions of learning that he proposes. These dimensions are practice, community, meaning, and identity. We conclude this section by briefly explaining these dimensions in order to be able to connect them to the learning opportunities in the community of practice we identified.

Practice: Learning as doing

The first dimension, practice, includes a view of learning as the social pursuit of an enterprise considered from a socio-historical perspective. Learning as a result of participating in a practice implies more than merely learning to do a new task; it involves "shared historical and social resources, frameworks, and perspectives that can sustain mutual engagement in action" (Wenger, 1998, p.5). In

this case, the practice of mathematics education within the classroom includes the history of those involved within this practice, as well as the unequal power relations mediated through factors such as race, social class, and gender, which result in a differential access to social and cultural capital. This history and socio-cultural milieu influence the experiences of the teacher and students who at the same time reconstruct the practice of schooling and become part of the history and tradition of those who follow.

Community: Learning as belonging

The second dimension, community, underscores the view of learning as belonging. In this view, one's learning is influenced and constituted by the changing community to which one belongs. The concept of community highlights the relevance of its members to define the learning experiences. The concept of community focuses on the social nature of learning as do other social theories (e.g. activity theory, sociocultural theory). However, this theory positions the interactions, discourse, norms, and meanings in light of the relationships among members and oneself with the community. In this research we define the community of practice as the classroom participants, the teacher and the students. This community, then, is a space in which the students and the teacher negotiate their understandings of the society and themselves and establish relationships with others.

Identity: Learning as becoming

Participation in a community transforms the identities of individual members. Learning is defined as this process in which the individual becomes part of a community and this participation changes who one is and creates personal histories of becoming in the context of particular communities (Wegner, 1998, p.5). This third dimension of learning is a dynamic and situated characteristic of individuals (Roth et al., 2004). A focus on this dimension, however, does not mean that educators should concentrate on changing students' identities; instead the goal is to facilitate access to peripheral participation.

Meanings: Learning as experience

A way to identify a community is using the collection of meanings shared by participants. The negotiation of meanings depends on the goals of the participants in the activity. Wells (1999) defines school learning as a semiotic process and the learning in this context as involving learning to do (practice) as well as to mean. The meanings negotiated allow its members to make sense of their participation. Humans participate in practices, become and belong to specific communities and in these contexts negotiate meanings. The breadth of meanings negotiated in the classroom community of practice is beyond the scope of this study. We only focus on those meanings related to mathematics or its learning.

CONTEXT AND METHODS

Socio-Historical Context

The setting of this study is the Southwest United States, which was a Mexican territory until 1854. Shortly after this transfer, the subordination of the Mexican population became a reality as a "historical process involving subtle demographic, economic, political, and psychological variables" (Sheridan, 1986, p. 6). In the school system, a majority of Anglo, teachers, administrators, and school

board members took on the task of educating Mexican students. These educators ignored the students' culture and language, which contributed to unequal educational opportunities. Even though Mexican leaders fought to make public schools a reality for the development of the Mexican community, discrimination cut short their goals. This truncation is true for those Mexicans born in this territory (before its annexation to the United States) as well as for those who continue to immigrate from Mexico and other countries in Latin America.

This decision-making for other people's children (Delpit, 1995) is still current and often results in detrimental consequences for the Latino community. For example, six years ago, Arizona passed an initiative that severely curtails the access to bilingual education. Proposition 203 is state initiative that was approved by Arizona voters and is now part of the Arizona state statutes. It proposes to replace bilingual education with Structured English Immersion classes for a period of one academic year. It states, "although teachers may use a minimal amount of the child's native language when necessary, no subject matter shall be taught in a language other than English" (A.R.S. Section 15-751 [5]). Bilingual education, a more effective approach, was substituted with a model that has scarce support in the educational or applied linguistics research (Combs, 2005).

The Classroom Community

This study takes place in a fifth-grade classroom at an urban elementary school in which ninety percent of the students are of Latino background and almost seventy percent of the students receive free or reduced lunch[2]. All the participants have some understanding of English and Spanish, although several of them predominantly use just one of the two languages. Instruction in this classroom was bilingual; however, many of the children were previously in English-only classrooms.

The education of Latino students is a growing concern in urban schools in the United States. This group is the largest and fastest growing minority group in the country. Almost fifteen percent of all students in the United States are Hispanic or Latino (U.S. Census, 2005). In addition, twenty percent of the children in K-12 schools are immigrant children (Paik & Walberg, 2007) and twelve percent of the total population speak Spanish in their home (U. S. Census, 2005). The Latino population, united by the historical legacy of Spanish, comprises a diverse set of people with dissimilar history, social class, place of birth (US or foreign-born, urban or rural), generation (e.g., first- or second-generation), language preference and fluency, political affiliation, and years of schooling, among other diverse characteristics. Each of these factors influences their experiences and learning in school.

Participants

The participants in the study are: nineteen fifth-grade students, the parents of five of these students, and the classroom teacher. We selected five of the nineteen students to develop in-depth case studies. These students are Mexican immigrants or Mexican-Americans. The students were selected in consultation with the teacher to include diversity in gender, mathematical proficiency, and their language fluency in English and in Spanish. The classroom was chosen based on our personal respect for the teacher as well as the teacher's national recognition for her teaching practice. She is a teacher-researcher who is articulate about her beliefs and values about teaching and learning, mathematics, and curriculum.

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[2] Free or reduced lunch is used as an indicator of poverty level

Data Collection and Analysis

This year-long qualitative study explores in detail the participation of Latino children and the teacher within a classroom community of practice. The use of multiple case studies (Dyson, 2005) allows us to bridge local particulars to the abstract social phenomenon of communities of practice. We used an ethnographic approach for the data collection which took place in three sites: the classroom, students' households, and three after-school programs. Our data consists of field notes from classroom observations and home visits, a collection of selected artifacts, and transcripts from selected videos and semi-structured interviews with the teacher, parents, and children. The analysis of the video transcripts, field notes of classroom observations, and interview transcripts is based on grounded theory (Charmaz, 2001), a process that explores emergent themes. This inductive analysis explores a comprehensive and dynamic picture of the students and the teacher in a particular school. The different sources were used to triangulate the information and build thick descriptions.

Four Dimensions of Mathematics Learning

In order to ground the discussion about some of the learning experiences in this community of practice we analyse one mathematics investigation that begins at the end of March and lasts about two weeks. Probability is the main focus of this inquiry. This exploration connects with some of the previous mathematical experiences as well as the different academic areas such as literacy and science. Children first explore some concepts of probability in an investigation tossing one and two coins; then children learn about endangered species and use probability to discuss the risk of extinction of some animals. The detailed analysis of this lesson allows us to connect the learning experiences within this community of practice with the theoretical framework of learning as participation.

Practice: Mathematics education

The day-to-day practice of this classroom community counters some of the hegemonic mathematics education practices that alienate minoritized communities such as a top-down model of accountability and a view of mathematics as an objective and ahistorical knowledge-base. The State Department of Education reifies its vision for schools through its Standards and its performance objectives (http://www.ade.state.az.us/standards/math/, Arizona Department of Education, April 20, 2007). These objectives are organized sequentially from readiness to proficiency level (for kindergarten to twelfth grade) which suggests that learning probability is sequential. Probability is disentangled and presented to educators as an organized list to teach progressively. The goals are also isolated from any context which assumes it is a knowledge base to be applied to diverse contexts as well as isolated from the other mathematical domains. In this definition, context is a situation in which the concepts are applied and the goal is that individuals abstract this knowledge from the concrete experiences which means they are able to generalize this knowledge base. In contrast, situated learning regards learning and knowledge as socio-historical and political (Lave, 1988) and embedded in participation which parallels the teacher's (Olga) teaching practice.

Furthermore, these standards do not exist in a socio-political vacuum (Apple, 1992). A heightened top-down control over the curriculum and teaching practices prescribe curriculum as content to cover, which promotes a pre-established list of behaviourally defined competencies. For instance, in this school district, teachers have to post the specific performance objectives for each lesson. Teachers are

expected to cover curriculum and day by day guidelines restrict the choices of teachers and students. This top-down model of accountability faces resistance in this community of practice guided through the teacher's deliberate efforts. Sometimes, after an investigation, Olga handed-out the grade level goals to the students and they used these goals as a reference to describe their learning. Each student or group of students wrote a unique piece about their experiences. This self-evaluation shares the control with students.

A top-down model of accountability merges with commonly held views about the learning of mathematics. In our society there is a dominant belief that the learning of mathematics is based on an individual, scarce, genetic ability. Therefore individuals who are not successful in school mathematics are deemed with a 'widespread' deficit. By the same token, individuals who are successful in school mathematics are considered to behold a 'special' gift. These assumptions have oppressing implications for non-mainstream students whose participation is often an uphill battle. Although these views exist in the peripheries of this community, Olga's vision for learning in this classroom is situated and based on experience. Children participate in the different engagements based on their own background knowledge and understandings. The probability explorations in this classroom are tied to familiar contexts for the children, such as basketball, blood samples, or coin toss. Throughout the activities Olga underscores how probability aids them in their negotiation of meanings of those events. Probability is a text woven through the meaningful engagements of participants. In this way, probability is tied to their life experiences and becomes a tool to make sense of their world.

Community: Relations between the teacher and students

In this classroom, the characteristics of the community are structuring resources to ensure access for all participants. Some of the characteristics of participation in this community are collaborative and non-biased relations. Children sit at a table assigned at the beginning of the week in a random way. In each table there is a chairperson and this role rotates throughout the week. The chairperson has the role of picking up or taking back materials, and at times was the spokesperson for the small group at a table. Since this role is randomly assigned, it distributes the responsibility avoiding teacher or student biases—a structure that supports equal participation. A random assignation of students in small groups and the chairperson is a decision based on the belief that diversity is central for learning. Children are expected to work collaboratively with all students in the classroom. Caring relationships and of respect are expectations and became a norm.

Olga structures the activities based upon collaboration. To support the participation of all students, before the class starts to work in their small groups, Olga asks children to make sure that everyone at their table knows what they need to do; children then check that everyone knows the instructions. There is an expectation that each of them is going to be part of this activity. This means they are expected to share their thoughts and understandings no matter how diverse is their history and experiences with mathematics in school. In the first activity for their study of probability each small group has the task to collect the data of twenty coin tosses. After each small group finishes, Olga collects the data and gets the results from a sample of a hundred. Each student is responsible for recording their personal and group outcomes. In this way, the activities are based on the idea that each student will contribute with their work so that the group can make an interpretation. These interactions are part of what it means to be a member of this community.

Meanings: A negotiation to read and write their world

This community celebrates mathematics as a tool to understand, interpret, and be critical of their world. Olga introduces this inquiry narrating stories from her personal life and their geographical context—from their neighbourhood to the world—in which she highlights the use of probability. In her stories she describes weather predictions, medical diagnosis based on blood samples, electoral predictions published in the newspaper, and the last basketball game statistics from the local team. The following is an excerpt from her narration of the last basketball game she watched on television underscoring the relevance and critical role of probability.

Olga:	Now, when I was watching the game on Sunday, probability was really important because…[our team] could win if they could make two points. There was a two point difference! So they are playing basketball, and this really good player has the ball. Our player can't help it, he's got to foul that player because he's got to stop the clock. So they foul the guy, that guy had an 85.7 chance of making the three throw. How close it that?
Students:	Really close
Olga:	Ay! 85.7 percent and he had six shots out of the seven [Olga writes 6/7] during the whole game he had made those shots on free throws. Do you think it is likely that he is going to make that basket?
Students:	Yeah!
	[Olga continues narrative of game.]
Olga:	So probability, oh and basketball Ah! All the time! So it's in everything we do (video transcript, March 21st, 2007).

This community constantly reifies the belief that mathematics signs are important tools for interpreting their world. Olga's narratives naturally fuse mathematics into the world and the world into mathematics. Children participate in this perspective of mathematics. For instance, Yessenia asks light-heartedly, "What's the probability that we are going to play basketball Ms.?" Andres then connects the concept of probability with a science experiment. The previous day he investigated the law of motion by rapidly removing a piece of paper that was between the top of a cup and some coins and allowing the coins to drop into the cup. He said he had a high probability to get the coins in the cup. Students spontaneously volunteer these stories in which they recognized the use of probability. In these interactions it is possible to see how the community has embraced the idea of "numbers count because ideas count" which is a quote Olga posted on a wall of the classroom. This quote embraces one of her deep beliefs about mathematics and describes the negotiation of meanings in this community.

Identity: Students as subjects of their education

A salient aspect in this community of practice is the engagement of students as subjects of their education. They engage in a humanizing education that acknowledges students as agents in their learning. This means that this education acknowledges students' own purposes and distinctive experiences. Students' agency is supported by a pedagogy that continuously builds from the background knowledge of students, uses the world to make sense of mathematics, and mathematics to make sense of their world.

At the beginning of this inquiry Olga reminds students that they need to establish connections with their previous experiences and expertise. Olga tells the students, "Whenever you investigate in mathematics you always have to think about what you know." In this context, their previous knowledge includes their experiences outside and within this community, their communicative competency, and their cultural background. Students are considered full individuals with a wealth of experiences that are critical for their learning.

At the same time, children are expected to make sense of probability and their world within these inquiry projects. The introduction to these activities framed probability as prevalent in students' everyday life experiences. The main projects in their study of this topic were the common practice of flipping a coin and an exploration about endangered species, a connection to the theme of the year of world-mindedness. In both cases children are asked to use probability as a tool to make sense of their experiences. In the second one, they are also invited to think of themselves as citizens of the world and connect their actions to their environment. Children participate in this community as mathematicians and as citizens with a critical mathematical perspective. Since the first day of school, children reflected on their responsibilities as citizens of the world. For this activity, children represent the actual proportion of three endangered animals in the wild: Siberian tigers, giant pandas, and black rhinos. Furthermore, students are expected to make sense of the numbers and data and their relationship in this investigation. For example, Olga says, "we try to make them [numbers] friendly, so we can better understand them." She describes decimals, fractions, and percentages as synonyms that allow one to visualize the quantities. Olga expects children to ground their experiences on understanding, creation of images, and connection to concrete experiences.

The type of experiences and relationships within this community of practice has profound implications for the identities of students. The attitude of children is of engagement; they care about the outcomes in the probability experiments since they are participants rather than spectators (Dewey, 1916). Children explicitly share that these projects are entertaining and implicitly show their interest by actively participating in the projects and writing personal statements about the implications of the mathematical outcomes.

CONCLUSION

In this paper we discuss some of the "lessons" students learn through their participation in a community of practice. Students learn to participate in 1) a *community* that is collaborative and uses diversity as a resource; 2) a *negotiation* of mathematical *meanings* to read and write their world; 3) a transformation of their *identities* as critical Latino/a citizens and active learners; and 4) a transformative *practice* guided by a vision of the roles of critical citizens in a democratic society. This fifth grade classroom is a community of practice that counters the narrow understanding of learning represented and reified through most schooling structures. This community of practice contests the idea that learning is an individual process, teaching means filling children with knowledge, and knowledge can and should be separated from the social and physical context. At the same time, it supports the idea that knowledge means a negotiation of meanings tied to a community, in which individual students engage within a democratic practice which shapes who they are. Their identities and the nature of the community are components of students' learning and central to the teacher's vision. Olga explains,

"my expectation is that they realize that they are important human beings, and anything that I do is to make sure that they are seen in that light. It's not my job to judge them but to discover them, so my goal in my teaching is to create teaching circumstances that allow me to discover more and more about the kids and what they bring to me and how I can use those experiences as the core of my curriculum." (teacher interview, June 2006)

We conclude with this quote to emphasize that a fundamental component for establishing a transformative and democratic education is a vision that includes a comprehensive definition of learning and education.

References

Abreu, G. d. (2002). Towards a cultural psychology perspective on transitions between contexts of mathematical practices. In G. d. Abreu, A. J. Bishop & N. C. Presmeg (Eds.), *Transitions between contexts of mathematical practices* (pp. 173-192). Great Britain: Kluwer Academic Publishers.

Apple, M. W. (1992). Do the standards go far enough? Power, policy, and practice in mathematics education. *Journal for Research in Mathematics Education*, 23(5), 412-431.

Arizona Department of Education (2007). Standards-Based Teaching and Learning. Retrieved April 20th, 2007, from http://www.ade.state.az.us/standards/math/

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-43.

Carraher, T. N., Carraher, D. W., & Schliemann, A. D. (1985). Mathematics in the streets and in schools. *British Journal of Developmental Psychology*, 3, 21-29.

Charmaz, K. (2001). The grounded theory method: An explication and interpretation. In R. M. Emerson (Ed.), *Contemporary field research: Perspectives and formulation* (pp. 109-126). IL: Waveland Press Prospect Heights.

Combs, M. C., Evans, C., Fletcher, T., Parra, E., & Jiménez, A. (2005). Bilingualism for the children: Implementing a dual-language program in an English-only state. *Educational Policy*, 19(5), 701-728.

Delpit, L. (1995). *Other people's children: Cultural conflict in the classroom*.New York: The New Press.

Dyson, A. H., & Genishi, C. (2005). *On the case. Approaches to language and literacy research*.New York: Teachers College, Columbia University.

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*.New York: The Macmillan company.

Engestrom, Y. (1991). Non scolae sed vitae dzsczmus: Toward overcoming the encapsulation of school learning. *Learning and Instruction*, 1(1), 243-259.

Gonzalez, N., Andrade, R., Civil, M., & Moll, L. (2001). Bridging funds of distributed knowledge: Creating zones of practices in mathematics. *Journal of Education for Student Placed at Risk*, 6(1&2), 115-132.

Hart, L. E. (2003). Some directions for research on equity and justice in mathematics education. In L. Burton (Ed.), *Which way social justice in mathematics education?* (pp. 27-49). Westport, CT: Praeger Publishers.

Hutchins, E. (1993). Learning to navigate. In S. Chaiklin & J. Lave (Eds.), *Understanding practice* (pp. 35-63). Cambridge: Cambridge University Press.

Lave, J. (1988). *Cognition in practice*.Cambridge: Cambridge University Press.

Lave, J. (1996). Teaching, as learning in practice. *Mind, culture, and activity,* 3(3), 149-164.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*.Cambridge, United Kingdom: Cambridge University Press.

Masingila, J. O. (1994). Mathematics practice in carpet laying. *Anthropology and Education Quarterly*, 25(4), 430-462.

Masingila, J. O., Davidenko, S., & Prus-Wisniowska, E. (1996). Mathematics learning and practice in and out of school: A framework for connecting these experiences. *Educational Studies in Mathematics*, 31, 175-200.

Moll, L. C., & González, N. (2004). Engaging life: A funds-of-knowledge approach to multicultural education. In J. A. Banks (Ed.), Handbook of research on multicultural education (2nd ed. ed., pp. 699-715). San Francisco: Jossey-Bass.

Moll, L. C., & Greenberg, J. B. (1990). Creating zones of possibilities: Combining social contexts for instruction. In L. C. Moll (Ed.), *Vygotsky and education: Instructional implications and applications of sociohistorical psychology* (pp. 319-348). Cambridge, United Kingdom: Cambridge University Press.

National Council of Teachers of Mathematics. (1998). Teaching and learning mathematics in poor communities. Paper presented at the Mathematics Teaching and Learning in Poor Communities: Working Conference, O'Hare, Chicago, Illinois.

Nieto, S. (1999). *The light in their eyes: Creating multicultural learning communities*. New York: Teachers College Press.

Nunes, T. S., Analúcia Dias; Carraher, David William. (1993). *Reflections on street mathematics in hindsight. In Street mathematics and school mathematics* (pp. 127-154). New York, NY: Cambridge University Press.

Paik, S. J., & Walberg, H. J. (2007). Introduction and overview. In S. J. Paik & H. J. Walberg (Eds.), *Narrowing the achievement gap* (pp. 1-13). New York, NY: Springer.

Rogoff, B. (1994). Developing understanding of the idea of communities of learners. *Mind, Culture, and Activity*: *An International Journal, 1*, 209-229.

Roth, W. M., Tobin, K., Elmesky, R., Carambo, C., McKnight, Y.-M., & Beers, J. (2004). Re/making identities in the praxis of urban schooling: A cultural historical perspective. *Mind, culture, and activity*, 11(1), 48-69.

Schoenfeld, A. H. (2002, July 1-6, 2002). Looking for leverage: Issues of classroom research on "algebra for all". Paper presented at the International conference on the teaching of mathematics, Crete, Greece.

Secada, W. G. (1992). Race, ethnicity, social class, language, and achievement in mathematics. In D. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 623-660). New York: Macmillan.

Sheridan, T. E. (1986). Los Tucsonenses: The Mexican community in Tucson, 1854-1941.Tucson, AZ: The University Press.

U.S. Census Bureau (2005). State and County QuickFacts. Retrieved July 1st, 2007, from http://quickfacts.census.gov/qfd/states/04000.html

Valencia, R., & Black, M. (2002). Mexican Americans don't value education!"--on the basis of the myth, mythmaking, and debunking. *Journal of Latinos and Education*, 1(2), 81-103.

Wells, G. (1999). *Dialogic inquiry: Towards a sociocultural practice and theory of education*.Cambridge, United Kingdom: Cambridge University Press.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*.New York, NY: Cambridge University Press.