

LEARNING BY OBSERVING AND PITCHING IN: IMPLICATIONS FOR THE CLASSROOM

Maricela Correa-Chávez and Angélica López-Fraire

In this chapter, we outline some of the ways that learning in classrooms can more closely mirror what we see when children engage in Learning by Observing and Pitching In (LOPI) to family and community activity. LOPI is more than one particular behavior or practice, it is an approach to organizing learning that includes children having the opportunity to routinely observe and listen in on mature activities to which they are expected to contribute. This form of organizing children's lives and learning is especially common in communities that have historical Indigenous roots in the Americas (Correa-Chávez, Mejía-Arauz, & Rogoff, 2015). Luis Urieta (2013) described a particularly illustrative example of LOPI from the P'uhérpecha community of Nocutzepu in Michoacán, México:

Daniela (pseudonym), age five, was regularly observed making small, awkwardly shaped tortillas that her mother Isaura cooked on a *comal* (clay grid-dle) over a fiery *parangua* (hearth). Isaura, usually very busy, seemed not to pay too much attention to Daniela as she usually struggled with the dough. Isaura would, however, once in a while say "*¡fíjate!*" (look with fixation) to Daniela, as she turned half of her upper torso toward Daniela while shaping a tortilla with her hands. Daniela would respond by looking at and imitating her mother's movements, until Isaura resumed her position facing the *metate* (grinding stone), and placed the finished tortilla on the *comal*. Every attempt Daniela made at shaping a tortilla ended up cooked on the *comal*, and Isaura would quickly offer Daniela more dough. On occasion when Daniela started to head out of the kitchen, Isaura would quickly say "*tómala*" (take this) and would again hand her more dough. Even when Daniela's dough ended up on the dirt floor, Isaura cooked it and fed it to the dog

and advised Daniela by saying "*¡cuidado Dani!*" (careful Dani). Daniela's better tortillas were always placed at the top of the pile, and were the first to be eaten as Daniela watched smiling silently, thus rewarding Daniela for her effort and contribution and encouraging her to continue to pitch in to tortilla making.

(Urieta, 2013, p. 325)

We begin by reviewing some of the research findings that have explored different aspects of LOPI. We do not describe all facets of LOPI (see Rogoff, Mejía-Arauz, & Correa-Chávez, 2015), but rather focus on the community organization of LOPI, the means of learning in LOPI, the social organization of endeavors in LOPI, the means of communication and coordination in LOPI, autonomy in LOPI, and motivation in LOPI. Following each research section there is a brief classroom tip that relates the research to the classroom context. At the end of the chapter, we consolidate the findings to provide larger suggestions that can be implemented in schools. We outline steps individual teachers can take in their classrooms, and suggest changes that would be beneficial at the institutional level to change our paradigms of learning and incorporate some strengths of LOPI.

Throughout this chapter we contrast LOPI with traditional ways of structuring school learning with teachers as transmitters of information that children soak up as they sit at their desks, in what Rogoff and her colleagues have called *Assembly-Line Instruction* (ALI) (Rogoff et al., 2003). Decades of research have shown that ALI is not the ideal way to structure learning (Bransford, Brown, & Cocking, 1999), but it is still common in many schools. When Texas first-graders from Latino immigrant families (who attended a school organized by ALI) were shown videos of first-graders at a nearby school taking agency in learning by moving from their desks to help one another and seek answers, the interviewed students characterized the children in the video as "bad" for not following the rules and sitting quietly at their desks (Adair, 2015). LOPI starts from a different place. In this way of learning, children are not receptacles of information, or even necessarily co-constructors of knowledge; rather they are value participants in important ongoing activity. Because of this, we see different patterns of interaction when we compare children's behaviors in communities where LOPI is common to the behaviors of children in communities where ALI is common. This contrast is one we turn to next, outlining some of the results of studies where this comparison has been central to examining learning.

Community Organization of Learning in LOPI

At the heart of LOPI is children's inclusion in ongoing family and community activity in meaningful ways. Children are not "being prepared" for future participation in community activity (sometimes referred to as adult activity), rather they

participation is ongoing and already valued, even if not at an expert level. The example of Daniela making tortillas at the beginning of this chapter clearly illustrates this idea. Although Daniela's end results still needed work, she was nevertheless able to see that her contribution was important because the tortillas served to feed the family and occasionally its animals.

In this example, Daniela was not "playing" at making tortillas, neither was she taking part in a "tortilla-making exercise" where the only purpose was to teach her. Rather, Daniela was involved in the actual activity alongside her mother, observing her mother's work, and engaging to the best of her abilities even though she was not participating at a competent or expert level. Nonetheless, she was part of the real activity and her contribution was seen as legitimate and important. This inclusion in central and productive ongoing activity is not incidental, but rather fundamental to the organization of LOPI, and has been for centuries (Chamoux 2015; Flores et al., 2015).

Accounts such as Daniela's have been seen in the historical record dating back to the Mesoamerican codices outlining family life prior to the European invasion and colonization of the Americas. What is common in both the historical record and in the ethnographic accounts and interviews of the present day is the idea that children learn through co-presence in activity, through facilitation by more knowledgeable others, and through observation (Chamoux, 2015). Another important theme present in both historical records as well as in current day interviews (Cardoso, 2015; Garcia, 2015) is that children are learning not only one important skill or practice through their participation (for example "just" learning how to make tortillas or how to care for crops), but rather they are also learning how to be members of the community, with all that this entails. Learning to be everyday participants of a community involves being aware of others, attentive to the needs of others, and respecting others' initiative, topics we will discuss in more detail.

Brief tip: Include children in the meaningful work of the community (in schools, the community could be the classroom), and not only in exercises that prepare for later inclusion in the larger community or labor market. Children can, for example, take the initiative in helping peers with their work, can help teach or demonstrate a subject or topic of interest, or can plan an event or activity around an academic topic.

Means of Learning in LOPI

In LOPI, because young children are regularly included in the wide range of social and productive activities of their community, they are often in positions to observe and listen to ongoing events, and are expected to pay attention in order to be able to contribute to them in the future. Psychological research shows that young children are especially interested in adults and pay close attention to what they are doing (Coppens & Rogoff, 2017a); thus co-presence and collaboration

with others is likely rewarding to most young children. Nevertheless, in most middle-class communities, children are often largely segregated from adults in early childhood and instead encouraged to engage in developmentally appropriate child-focused activities (Morelli, Rogoff, & Angelillo, 2003). However, when children are included in the work of family and community, as they are in many Indigenous heritage communities of the Americas, they are not only generally interested in the activities, but can also see how their contributions help their families and communities. Adults in communities where LOPI is common urge children to be attentive to what is taking place around them and seek out moments when their help or contribution is needed (Chavajay, 1993). Interviews with parents and other adults have shown that observation of others and of ongoing activity is one of the principal means through which learning takes place in LOPI (Chamoux, 1992; Mejía-Arauz, Rogoff, & Paradise, 2005; Rogoff, et al., 2003). For example, parents in a Mazahua community in central Mexico reported that observation as a form of learning is a more direct and effective way of transmitting knowledge compared to lessons or giving directions (de Haan, 1999).

Sentiments such as the one expressed by the Mazahua parents are common in many Indigenous communities of the Americas and research has shown that children from communities where LOPI is common often managed their attention differently compared to children from middle-class communities where ALI is more common. A series of studies examining what children attended to when they had the opportunity to observe a nearby activity, but were not expected or required to attend to it, showed that children from Mexican immigrant and Guatemalan Maya families (where LOPI is common), were more likely to pay attention to the actions of the others compared to children from families who were more familiar with schooling and middle-class practices. The children whose families had more experience with school practices, in contrast, were more likely to attend to a distractor toy, pay attention to the room itself, or seem to "space out." Additionally, these studies focusing on third party attention also consistently showed that children who observed the ongoing task could remember and use that information a week or more later when they were given the opportunity to engage in the same activity. In fact, all children who had paid attention to the activity learned something about the task (regardless of cultural background); unsurprisingly, the children who did not pay attention to the activity of others, did not learn (Correa-Chávez & Rogoff, 2009; López, Correa-Chávez, Rogoff, & Gutiérrez, 2010; Silva, Correa-Chávez & Rogoff, 2010).

Other studies examining cultural differences in children's attention and LOPI found that toddlers, children, and adults from Guatemalan Maya and Mexican immigrant communities (where LOPI is common) were skilled at attending to multiple ongoing activities in their environment in a smooth uninterrupted manner compared to people who were more familiar with school ways of organizing learning (Chavajay & Rogoff, 1999; Correa-Chávez,

Rogoff, & Mejía-Arauz, 2005; Rogoff et al., 1993). Whether attending to the activities of others or skillfully attending to two activities, the attentional skills demonstrated by children whose families had Indigenous history and familiarity with LOPI were often different than the way attention in school is typically displayed (Paradise et al., 2014). School actively discourages attending to the work of others in one's environment by labeling it as cheating and asks that attention to learning be demonstrated by undividedly focusing on either the teacher or one's own work. Yet expecting only these school-like forms of attention from children may also prevent children from using some of the tools they have commonly used in their families and communities for learning. **Brief tip:** Attention to others' activities is an important and valued means of learning in communities that have Indigenous heritage. This can be incorporated in classrooms by encouraging children to learn from one another's work throughout the day—rather than talking about cheating or copying, talk about how children can become productively informed by others. There are likely many activities where children can be encouraged to observe and learn from peers.

Social Organization of Endeavors in LOPI

In LOPI, the expectation to observe ongoing activity is usually accompanied by an expectation of help, or participating in the activity itself. The following quote was an answer given by a P'urhépecha (Mexican) mother with eight years of schooling to researchers when asked how her children helped at home:

Sometimes when they see that I am washing, the older one (10 years old) will tell the younger one (8 years old), "start hanging the clothes to dry or clean up." I'll see my older daughter sweeping and the younger one washing dishes in the kitchen ... she'll clean up and they'll tell me, "mom we already cleaned the kitchen while you were washing" or something like that [and I tell them] "that's good, thank you."

(Mejía-Arauz et al., 2015)

Later in the interview this same mother went on to say that the children help her because they wanted to, not because they were given rewards for helping or punishment for not helping. Collaboration in family and community work from early ages has been found to be common in Indigenous heritage communities of the Americas including in: household chores, childcare, animal care, participation in celebrations and festivals, and translation for adults (Gaskins, 2000; González, Moll & Amantí, 2005; Orellana, 2001; see also the chapters by García-Sánchez and Reynolds and Orellana in this volume).

Several studies have also found collaboration and helping as common among Indigenous heritage and Mexican heritage communities in peer interactions. For example, compared to children whose families were familiar with middle-class ways, Mexican heritage siblings (from immigrant families familiar with LOPI) were more likely to work together and build off one another's actions on a joint activity (Correa-Chávez, 2016). When asked to work together on a planning task, Mexican heritage sibling pairs from immigrant families with basic experience with western schooling showed sophisticated patterns of blending their agendas by collaborating fluidly, anticipating each other's actions and sharing leadership and exchanging roles in order to accomplish the task (Alcalá, Rogoff, & López Fraire, 2018). This contrasts with sibling pairs of highly schooled European American families who often divided the task, collaborated half as much, and instead of sharing ideas, took turns while sometimes excluding a sibling. In Mexico, P'urhépecha children were more likely to work together as a team when playing a board game against another team than were middle-class children from a Mexican cosmopolitan city (Correa-Chávez, Mangione, & Mejía-Arauz, 2016).

Brief tip: In LOPI, collaboration is a built-in expectation and may be a taken for granted way to demonstrate learning as well as a way to continue to engage in learning. If we create classroom cultures where learning from others is encouraged then we will likely also see children taking the initiative to work together and collaborate.

Communication and Coordination in LOPI

Although many schools and educational researchers have called for increased collaboration in schools, the model of collaboration presented is often one that is particular to schools and different from the LOPI model. For example, in one study, children from a traditionally organized classroom who were asked to collaborate mostly used tests and quizzes instead of interacting in ways that built off others' efforts (Matusov, Bell, & Rogoff, 2002). Additionally, among people who are familiar with schools, collaboration is usually accomplished and organized through extensive use of talk with assigned and divided roles (Dixon et al., 1984; Kim, 2002). However, the participation patterns for collaboration often look different in communities where LOPI is common, perhaps because of the assumption that participants are already paying attention to what others around them are doing. (See the chapter by Marin in this volume for further exploration of joint attention to local environments between parents and children in urban forest walks.)

In teaching interactions between Zinacantan Mayan siblings, children with only a few years of schooling used more talk when teaching a younger sibling compared to children who had not been to school, who tended to use more bodily closeness and bodily guidance as teaching tools (Maynard, 2004). When

children were placed in groups of three with an adult who was teaching them a new task, European American children were more likely to communicate with one another using talk, whereas U.S. Mexican heritage children whose families had few years of schooling (and whose families had immigrated from rural Mexico) were more likely to engage in multiple nonverbal turns at communication (Mejía-Arauz et al., 2007). Similarly, when Mexican heritage sibling pairs in California were working together to construct a three-dimensional puzzle, pairs whose parents had few years of schooling and more familiarity with LOPI collaborated more but also did so in a way where talk was used in conjunction with ongoing activity to advance the task. Contrariwise, pairs whose families had more school experience more commonly used talk to organize the activity overall and figure out what to do next (Correa-Chávez, 2016).

From an early age, talk may be just one of many tools that children use in their interactions with others in communities where LOPI is common. For example, when asking for help from their mothers who were busy with something else, Mayan toddlers relied on gaze, touch, and body posture in their requests more often than European American toddlers who rarely used these (Rogoff, et al., 1993). Similarly, school aged Mexican heritage children in the U.S. were ten times more likely to patiently wait, checking that an adult was not busy before asking for help compared to European American children who loudly and frequently interrupted ongoing activity (Ruvalcaba et al., 2015). The idea of blending agendas in collaboration where participants build on other's actions as they work together and may not necessarily need extensive verbal explanations of ongoing activity appears to be more common in Indigenous heritages communities familiar with LOPI than in middle-class communities. When programming a computer game together, pairs from Indigenous heritage U.S. Mexican families collaborated twice as much compared to European American pairs and when they did so engaged in a form of shared thinking that did not require stopping for proposals. The European American pairs rarely engaged in this form of collaboration (Ruvalcaba & Rogoff, 2016). However, traditionally organized schools tend not to promote these forms of collaboration (Marusov et al., 2002), focusing instead on individual accomplishments and narrowly defined verbal competency (Hart & Risley, 1995).

Brief tip: In LOPI, collaboration may involve blending of agendas between participants and talk may be used in ways that are different than how it is used in school. Paying attention to what children are doing while they are working together, and not only what they are saying (or the end product) may help make these forms of collaboration more visible.

Autonomy in LOPI

Ethnographic research indicates that collaboration and helping are expected and often voluntarily offered among Indigenous heritage and Mexican heritage children (de Haan, 2001; Coppens et al., 2014; Orellana, 2001). For example,

Mexican and Central American heritage children in California serve as active agents in supporting their families and schools, and these everyday work and contributions to their home and school provide avenues for learning and linguistic and cultural brokering between their home and the outside world (Orellana, 2001; see also Reynolds and Orellana, this volume). This has also been shown with Moroccan children living in Spain; see García-Sánchez, this volume, for further elaboration on differences in the ways children's work is valued in out-of-school contexts and in schools. But what is often most striking to middle-class audiences regarding collaboration in LOPI, especially in the home context, are the assertions by parents that they do not have to make children participate, but rather that children either "want to help" or simply engage in help without being asked.

Ramírez Sánchez (2007) describes childhood in a system of reciprocity and exchange among the Nahuas of Tlaxcala, Mexico where everyone helps members of their family, especially those in the same household. The Nahua children claim not to be working even when heavily involved in family work. It is described as just "helping as a matter of being part of the family". "Working" in the community is defined as paid work. Similarly, children from the Yucatan peninsula seemed surprised by the question when they were asked why they help. The answer seemed obvious to them and they viewed helping as a part of living in that home or being part of the family (Alcalá & Cervera, 2019). Both Indigenous heritage mothers and children in California and Mexico also indicated the importance of helping with initiative because it comes from the heart and without parental control. The children themselves also described wanting to help because they are a part of the family (Coppens et al., 2014).

Studies conducted with families of toddlers showed that three-year-old children were often eager to participate in chores; however, this desire disappeared as children were not allowed to participate or not deemed competent enough to participate. Interviews with European American and Mexican heritage mothers of two- to three-year-old children in California showed that the Mexican heritage mothers incorporated their toddlers in ongoing work, whereas European American mothers tried to avoid having their children involved in ongoing work. In the interviews, over half of the European American mothers said they avoided including their toddler in joint work, often because they wanted to spend the time engaging with their child in a more meaningful or cognitively enriching way. Sometimes, this was also done in the name of efficiency (Coppens & Rogoff, 2017b). Mexican heritage mothers, in contrast, emphasized the joint nature of the activity and the idea that helping developed the desire to help even more within their children.

Similarly, a sociolinguistic study examining ongoing interaction as toddlers attempted to engage in activity in a Chamula Maya community in Chiapas, Mexico illustrates how toddlers' initiative is respected even when

adults would rather not have children's help in the moment. For example, in one analysis a three-year-old insisted multiple times on washing her clothes even though adults tried to distract her from the activity. However, the child's insistence and desires were respected in the end and her activity was allowed to proceed (Martínez, 2015). This respect for others' wishes, even the desires of a three-year-old, are also part of learning to value an individual's autonomy in addition to valuing responsibility to a group (Mosier & Rogoff, 2003).

The cultural value of being *acompañado/a* (helping with initiative without being asked) might also be related to this respect for a toddler's or child's desire to help (López et al., 2012). Based on the studies described in earlier sections, children in these Indigenous communities may be more prepared to recognize such cues at earlier ages because of access to everyday mature activities and because of a community expectation to become involved. Studies have shown that children showed more prosocial behavior or agency where such behavior was encouraged, required, or expected (Adair, 2015; Mejía-Arauz et al., 2015).

These examples illustrate the intersection of autonomy and interdependence. In order to help others, children need to have a sense of interdependence, but also a sense of autonomy to act as agents. This respect for autonomy is something schools often fail to do in small and large ways. For example, some schools require all classrooms of the same grade to engage in the exact same schedule, leaving no room for individual children to engage in something of interest not on the schedule (Adair, 2015). Presumably this schedule is followed to ensure all children in a school are learning similar things. However, a close look at the example presented in Martínez' analysis of the toddler wanting to wash clothes shows that in LOPI children do not have an infinity of choices presented to them. Rather, it is when children express an interest in something that is already taking place or something that might be possible in this autonomy is often punished. It is therefore not surprising that six- to seven-year-old Mexican heritage children in California were contributing help to their families more often out of their own initiative compared to European American middle-class children (Coppens & Rogoff, 2017b).

Yet even in some classroom-like activity, we can see spontaneous help from children who come from communities where LOPI is common. When learning how to make origami figures, triads of Mexican heritage children from families that likely had experience with Indigenous practices more often offered spontaneous help than triads of European American children and Mexican heritage children whose families had extensive experience with western schooling (López et al., 2012). In a classroom-like activity, U.S. Mexican heritage sibling pairs from families with limited experience in western schooling showed more helping towards an adult during 15 scripted opportunities to help when compared to sibling pairs of European American families

(López Fraire, Rogoff, & Alcalá, 2016). Mothers were then interviewed about their initiative with household work and it was found that U.S. Mexican heritage children also helped more at home under their own initiative than European heritage children who helped more via contingent rewards and adult control (Alcalá et al., 2018). Interestingly, a group of U.S. Mexican heritage children from families with extensive experience in western school were similar to the other U.S. Mexican heritage children with initiative in household work by helping with initiative but like the European American group in not offering help during the classroom-like activity (Alcalá et al., 2018; López Fraire et al., 2018).

Brief tip: If we desire to see spontaneous help from children both in and out of school, we should respect their autonomy when they attempt to become involved in ongoing community activity. Allow children some leeway in activities to explore related issues, and allow children to take the lead in some activities.

Motivation in LOPI

The accounts of child autonomy in helping in Indigenous heritage communities where LOPI is common contrast with the narrative from middle-class parents about having to be "on top" of children to get them to help or participate in household work (Klein & Goodwin, 2013). Often the solutions middle-class parents reported resorting to in order to get children to participate mimicked school, and, in fact, many of the helping tasks that children in middle-class families were expected to do were similar to the exercise and drill work of school in important ways. Children's help at home in middle-class families was often relegated to small solitary tasks that did not seem central or important to children, such as washing one's dishes alone, making one's own bed alone, or putting away one's own clothes alone. Mejía-Arauz and colleagues (2015) argue that it is this separateness from others in household work that may lead to lower levels of initiative on the part of children, and that the communal aspect of work may be one of the most attractive things to children whose families practice LOPI.

Another important observation is that many of the helping tasks middle-class children were asked to do seemed to contribute very little to the well-being of the family or of others in the family. Parents in these families rarely talked about how their children knew that they (the parents) needed help, and thus children offered it freely. Instead parents often discussed how they turned to tools often used in school, such as calendars and chore charts, to motivate children into participating. The rewards used (stickers, happy faces, and gold stars) were also rewards frequently used by schools. There are therefore parallels between the solitary chores children were often asked to do at home and the solitary exercises they engaged in at school.

Additionally, just as small chores like putting away one's clothes are not central to the "work" of family and home, many of the exercises and drills children engage in at school are not central to the larger lessons and activities that we think children should learn on their way to full participation in community. Just as a child may not be able to see how making her bed is helping the family as a whole, she may not grasp the relationship that a geometry worksheet has to the task of building a doghouse, or the relationship that a grammar quiz has to writing a letter to an elected official. Leaving aside the question of whether exercises and worksheets are satisfying for children, it is the case that these are solitary activities, and much of the time in schools children are expected to engage in these activities on their own, neither receiving nor providing help that is similar to how children often engage in chores in middle-class families.

Brief tip: Rewarding children with small awards for simple practices or exercises does not seem to be related to continued involvement or investment in the activity. However, being involved in productive and legitimate community work with others *does* seem to be rewarding to children. By allowing children to build collaborative classrooms, we may see more cohesion in the classroom and investment in the activities they help design and to which they contribute.

Ideas for LOPI in Schools

We've reviewed research showing how children from families where LOPI was common were included in productive community work and how, as a result, studies found different patterns in the use of observation, attention, collaboration, talk, and in help with initiative compared to children whose middle-class families were more familiar with ALL. However, school in and of itself does not need to be based on an Assembly-Line model (Brown & Campione, 1990; Rogoff, Turkkanis, & Bartlett, 2001). There are many ways, big and small, that practices congruent with LOPI can be incorporated into classrooms. Here we would like to suggest a few, although undoubtedly there are many others that teachers and administrators might suggest.

Our argument in this chapter has been that children are motivated to participate in what they see as meaningful activity and that engaging children in small exercises is not as motivating or rewarding. This is likely one of the biggest challenges in classrooms where instruction is often focused on small pieces of information that will build up to a bigger task, or to the bigger picture. However, it is also likely the case that bigger concepts and ideas are the ones that are more interesting to learners.

We think it is possible to keep an eye on bigger ideas and concepts and start from there, even if those ideas have to be adapted somewhat for the intended audience. However, by keeping things interesting in the classroom

and allowing learners to see the big picture, they will likely be more motivated to participate. And as students engage in a larger task, or with a larger idea, they will learn the constituent parts. In Uribe's (2013) example of Daniela making tortillas at the beginning of the chapter, Daniela was not necessarily interested in learning how to estimate the amount of dough needed to make a tortilla—she likely just wanted to learn to make a tortilla! She also was likely not interested in learning how hot the *comal* (griddle) needed to be, or in how long to leave the tortilla on the *comal* before turning it. But in the process, she very likely learned how to estimate the proper amount of dough, how to gauge the *comal's* heat, and how to estimate how long to leave the tortilla—of course with some guidance. The same thing can be done in school. When people are involved in something they think is interesting or important, the details of the activity then become meaningful. In this way, children are still learning the constituent parts, but can also see the reason for learning the smaller details. Incorporating projects and portfolios that are evaluated in conjunction with student interviews is one way many educators have incorporated "the bigger picture" or larger themes into their classrooms (Rogoff et al., 2001). (See the chapter by Rosario-Ramos and Sawada for suggestions for having students take on meaningful real-world social issues as part of their classroom work.)

Of course, in order to engage in activities that children think are meaningful, we have to respect children's autonomy in learning. This is also a challenge in many schools, especially ones where the idea of standardization for all children is central. However, we think that within most lesson plans and curricula, it is possible to allow time and space for children to expand from the original plan to explore related themes and ideas that might be of interest to them. This can also be incorporated in a more formal way into the classroom by checking in with children and finding out their interests and how these could be incorporated into the planned instruction. (Of course the children would also need to be a part of these discussions and planning.) Just as the previous example with the toddlers participating in community work, respecting children's autonomy in the classroom does not mean that everything under the sun is fair game, rather that children's related, but not planned for, interests are respected.

Some nontraditional schools already evaluate children's efforts and contributions to ongoing tasks and to the setup of the task (as opposed to evaluating only end products) through dynamic assessment (Campione & Brown, 1987) and proximal formative assessment (Erickson, 2007). Rogoff and colleagues suggest that assessment of initiative would be a valuable addition to some of these other assessment practices, for example, by taking note of when children become fascinated by a new bit of information and take steps to investigate and find out more about it (Rogoff et al., 2015). The research on children's participation and helping at home in communities where LOPI is common

suggest that acknowledging and allowing children to take the initiative in learning may lead to increased participation in learning overall. Although we have not studied this empirically we believe that children who might otherwise not be motivated to participate in traditional school might be more engaged as they see their contributions as valid and appreciated in the classroom.

Similarly, acknowledging children's initiative also means allowing them to observe one another and collaborate while they are engaged in work in the classroom even if that activity were intended to be individual work (which can still be graded as individual work if needed). Although this suggestion sounds modest, it may be difficult to incorporate due to the fact that collaboration may not be recognized as such in cases where children are working without using the kinds of verbal marker that are common to traditional classroom activity. However, we believe that making teachers and administrators aware of the cultural variability in collaboration may lead to increased recognition in schools and classrooms. Recognizing the forms of communication present in interaction when children are working together and building off one another's work and ideas is an important first step, but an equally important step is acknowledging how important this interaction with others is to learning overall. This interaction and collaboration not only motivates many children to learn, but is also an important way that many children learn in community. Additionally, this interaction with others means being accepting of the variability that is inevitably present in any community of learners.

The idea of allowing children to participate is one that we have mentioned multiple times and is the one that we would like to emphasize as we end this chapter. In LOPI, children are allowed to participate even if their skill level would not be deemed to be "sufficiently competent" in certain areas. We would note that children become more competent in activity if they are allowed to participate in it; however, age-graded schooling is built on the assumption that there are skills that are only available to children once they have reached the appropriate level of maturity, the right age, or the right level of competence (Rogoff et al., 2005). This is counter to the idea that everyone can contribute, which is often seen in family and community activity where LOPI is common.

Perhaps one of the reasons for schools' persistent use of age gradation is due to its insistence on evaluating only end products to sort students rather than using evaluation as a way of providing feedback to move towards the completion of a goal or activity (Rogoff et al., 2003). However returning again to the example of Daniela and the tortillas, assessment was present in the fact that her best tortillas were always placed on top and eaten first, which is different than being placed in a "lower" or remedial group due to skill level. This is a way of excluding learners who are not deemed competent enough. Assessment of efforts in LOPI is not done to exclude or restrict participation in the ongoing activity, but rather to provide guidance so the learner can continue to participate and improve. In our current school system, we do not use assessment to

encourage and improve participation. That does not mean that we cannot, but more work is needed in this area. One important step in this regard is acknowledging the variability present in all communities, and seeing it not as a hindrance but as an asset that can be useful as children work together. We believe that incorporating what we know from LOPI into classroom learning can help teachers and students work with one another to reach their goals and build a community of learners in the classroom.

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SEEING TOGETHER: THE ECOLOGICAL KNOWLEDGE OF INDIGENOUS FAMILIES IN CHICAGO URBAN FOREST WALKS

Ananda M. Marin

Education researchers interested in improving science teaching and learning have increasingly focused their inquiries on understanding learning in informal or everyday contexts and potential relationships with scientific knowledge (e.g., Bang et al., 2015; Bell et al., 2012; Brayboy & Castagno, 2008; Marin & Bang, 2018; Medin & Bang, 2014; Warren et al., 2001). Along with others, I have argued that learning about/with the natural world is a cultural process embedded within everyday human activity (e.g., Cajete, 2000; Deloria & Wildcat, 2001) and that it is central to scientific endeavors, as well as science education (NRC 2007, 2012). Basic research on orientations to the natural world and associated knowledge building practices can support the design of teaching practices and learning environments for science education, particularly place- and field-based science education.

In 2005, I was invited to participate in a community-university research project that came to be named Living in Relationships (LiR). This ten-plus year collaborative research program began as a partnership between the American Indian Center of Chicago (AIC), Menominee Tribe of Wisconsin, at Northwestern University; later the University of Washington joined. Understanding nature-culture relations across learning contexts was a goal of the project. We also considered how science, a discipline with a fraught history among Indigenous and other minoritized communities, might be used to support community well-being and sustainable futures grounded in Indigenous ways of knowing and being (e.g., Bang et al., 2013).

In pursuit of the goals outlined above, the LiR team engaged in three lines of research: (a) studies of culture and cognition, (b) studies of everyday practices, and (c) community-based design research. For example, children and parents were asked to participate in a variety of research-based activities including