Community as Curriculum: Dewey's Theory of Inquiry in the Context of an Urban Agriculture Project

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Abstract

Urban agriculture programs are recognized as an effective way to bring students' cultural funds of knowledge into their school-based science learning, and in turn, to use the school-based learning to effect changes in the community. However, despite their potential to engage students in meaningful learning and to break the boundaries between school and community, many such programs are poorly integrated into the school-based science curriculum. In this study, we describe an urban agriculture project that was systematically integrated into high school science teaching and supported by the whole school community, later contributing to community action in the neighbourhood. Employing John Dewey's theory of inquiry as the analytical framework, we discuss the educational implications of the urban agriculture project and examine the goals of education and the value of the urban agriculture program, in terms of the growth of students and community.

Keywords: community-based education; inquiry-based teaching and learning; urban agriculture; theory of inquiry; John Dewey

Urban Agriculture as a Link to Connect School and Curriculum

Urban agriculture programs are recognized as an effective way to bring students' cultural funds of knowledge into their school-based science learning (Fusco, 2001). Exemplifying place-based education, they provide opportunities for students to analyze the economic and political decision making of their locales (Gruenewald, 2003). Most urban community garden organizers value the education of younger members as an essential component (Armstrong, 2000; Weissman, 2015). They encourage youth to participate in building healthy and democratic communities as citizen scientists (Mueller & Tippins, 2012). However, despite their potential to engage students in meaningful learning and to break the boundaries between school and community, urban agriculture programs are rarely integrated fully into school-based science curriculum. Instead, they remain a short-term, one-time event that science teachers may or may not incorporate into their lessons.

In this study, we describe an urban agriculture project that was systematically integrated into school operations and supported by the whole school community, later becoming part of community action in the neighborhood. Students were citizen scientists in the sense that they collected and analyzed data and learned about natural phenomena along the way. Going beyond many citizen science projects, they also generated the questions for inquiry, interpreted their findings, and applied them to address community needs. In these ways, citizen science truly became community science.

We describe how the project came about, what was actually implemented, and its implications. Our main goal is not about investigating the effectiveness of this particular case. Rather, we intend to examine the value and possibilities of urban agriculture programs in terms of the educational growth of students and community, and

illustrate how John Dewey's theory of inquiry can be used as a framework to analyze community-based urban agriculture education programs (Enfield, 2001; Won, 2009).

John Dewey's *Theory of Inquiry* as Analytical Framework

We adopted John Dewey's theory of inquiry to capture important aspects of the community-based school science curriculum and activities. Dewey's ideas have been influential in science education over the years, often with an emphasis on hands-on learning or experimentalism. Yet, other aspects of Dewey's ideas are often overlooked, in particular, his ideas about the fluidity of inquiry problems, the situated nature of inquiry, reflection on hindrances to inquiry, and inquiry as a participatory practical action.

In his *Logic: Theory of Inquiry* (1938/1991), Dewey describes how our understanding of the world develops through a process of inquiry. Knowing is a process of resolving indeterminacy in a situation, rather than one of accumulating facts. From this perspective, learning means developing and reconstructing our experiences to act upon significant aspects of our lived experience in a productive way. An important implication for curricula is that schools and other educational institutions need to provide constructive learning environments, where students bring in their significant experiences to explore, experiment, and transform so as to instigate progress on both individual and social challenges (Dewey, 1900/1976, 1916/1980).

There are three key aspects of Dewey's theory for the analysis of educational activities: *relevance* (relation of activities to learners' experiences), *participation* (mode of learners' engagement), and *significance* (impact on learners' individual and communal life).

To start the process of learning, learners need to realize the *relevance* of the problem or activity (Dewey, 1938/1988, 1938/1991). This component corresponds to

the intention or intended goals of educational activities. Dewey (1938/1991) wrote, "To set up a problem that does not grow out of an actual situation is to start on a course of dead work" (p. 112). When the activity relates to learners' lived experiences in a meaningful way, they put genuine effort to figure out and resolve the problematic situation. Because students' lived experiences determine the quality of a school activity for them (Dewey, 1902/1976, 1938/1991), teachers need to endeavor to provide more educative experiences based on their deep understanding of students' experiences.

In the process of learning, the mode of engagement should be collaborative and reflective *participation* (Dewey, 1916/1980, 1938/1988). The alignment of the means and the ends is central in Dewey's view on education. As students are engaged in a problem-solving activity of personal and social importance, the process needs to reflect the educational aims we want to instill in them. This mode of collaborative and reflective participation applies not only to students' interactions amongst themselves, but also in relation to the teacher(s), and even to community members outside of the school.

The outcome of the learning activities can be referred to as the *significance* of the learning. Because Dewey conceptualized learning as a dynamic interaction between the learner and the situation at hand, the outcome of learning is not limited to the knowledge the learner attained. Rather it is understood as a transformation of the learner and the problematic situation. "Experience does not go on simply inside a person …. Every genuine experience has an active side which changes in some degree the objective conditions under which experiences are had" (Dewey, 1938/1988, p. 22). By transforming in a meaningful way, the problematic situation and our interaction within it, learners experience significant learning.

For Dewey, then, inquiry begins in experience (relevance), requires active engagement (participation), and then returns its results to experience (significance). Unfortunately, formalized learning often reduces this three-stage process to the middle part of problem solving, and furthermore reduces that to limited or passive participation. The transformative power of inquiry is thus reduced, and it is less likely to have enduring value for the students.

In order to make these components of learning more visible in our analysis as well as to provide practical guidance for educators, we chose three questions for each (Table 1). The list of questions is used to capture the essential features of learning activities. Based on this list, we analyzed the urban agriculture project at an alternative high school in Chicago.

Table 1. Learning component checklist.

Key Questions
Relevance: Connection to students' experiences ▪ How was the inquiry activity initiated and understood in relation to the students' own personal and social experiences? ▪ How did the activity utilize the cultural, experiential resources of students?
Participation: Inquiry with reflection and collaboration ▪ How did the students contribute to the design and operation of the activity? ▪ How did the students collaborate with others? ▪ How reflectively did the students examine the progress of the inquiry?
Significance: Meaningful transformation of the situation ▪ What changes did the inquiry effect on the problematic situation? ▪ How did the activity help students participate in their life matters better? ▪ What further inquiry did the activity initiate?

Urban Agriculture Project at PACHS

School and Community Context

Pedro Albizu Campos High School (PACHS) is located in an ethnically diverse neighborhood in Chicago, with a large Puerto Rican population. Part of the Alternative Schools Network (ASN), the school has a reputation as a different kind of school, where students' concerns are actively brought in to the school curriculum, and students are supported to develop their cultural identities through community-based activities (Antrop-Gonzalez, 2003; Berry & Cavallaro, 2014; Bruce, 2008; Johnson, 2005).

The strong commitment towards its community is systematically built into the school's operations (Flores-González, Rodriguez, & Rodriguez-Muniz, 2006; Ramos-Zayas, 1998). That commitment is apparent in the location of the school—the Puerto Rican Cultural Center, where people come to plan and organize community activities concerning health, legal, psychological, and financial issues. The majority of teachers at PACHS are active community organizers, living within a couple of blocks from the school (Antrop-Gonzalez, 2003). They collaborate with other community members to plan and execute a variety of school activities and community actions, even during summer holidays (Bruce, 2008; Bruce & Bloch, 2013). They commit themselves to various community activities outside school, such as participating in protests, planning cultural events, or cleaning up the community (Antrop-Gonzalez, 2003). There is a regular town hall-type meeting so students can talk about the learning process within the school and how it might be improved. Due to the school's effort to provide cultural affirmation and a caring relation to students' lives, the dropout rate has dramatically decreased. Now, most students successfully graduate from high school and many of them go on to college (Bruce, 2008).

The school states its approach on its website (https://pachs-chicago.org):

> We offer basic skills training with activities in technology, urban agriculture, media production and communications, critical art, and participatory action research, as well as college preparatory coursework through an ongoing partnership with Wright College. Classroom instruction is primarily project and problem based with an emphasis on developing higher order thinking skills of inquiry and analysis in place of rote memorization. Planning for the years to come, our curriculum will have social ecology as a conceptual centerpiece, framing student learning around three experimental stations: a hydroponics-based greenhouse on the roof of PACHS; soil-based community gardens in and around Humboldt Park; and tropical soil-based agriculture on the island of Puerto Rico.

Development of the Urban Agriculture Project at PACHS

The school's community-based curriculum is enacted in part through urban agriculture projects, located within community action movements (Krasny & Tidball, 2009). Urban community gardeners in the US are often recent migrants from developing countries, with extensive practice-based knowledge in farming (Krasny & Tidball, 2009). Considering those two aspects, it is no surprise to see an urban agriculture project at PACHS as a way to enlist community resources and to address community concerns.

The urban agriculture project grew organically, with students' realization of the problem accompanied by the teacher's careful planning and support. When the new school year started in September, students saw thriving plants in a hydroponic garden with two-liter soda bottles on the windowsill of their science classroom. The students wanted to start a hydroponic garden project of their own. The teacher and students discussed ways to build a larger hydroponic unit, purchased an aquarium, pipes, and a pump, and made a hydroponic garden unit. As they tended the plants in the hydroponic unit, they learned about hydroponic gardening in comparison to soil-based gardening—

how plants grow without soil, the benefits and drawbacks of this method of gardening, etc. They also talked about the possibility of beautifying the community with flowers.

One day, the class discussed different issues in the community, such as gang activity and domestic violence. As they talked about gangs—the nature of the problem, contributing factors, and what could be done—they realized that people joined because gangs provided some of their basic needs—food, housing, and safety. The students reasoned if they could contribute to providing those basic needs to the community, people would not have to be involved in gangs as much. The science teacher then narrowed down the discussion to the food issue in the community. The students questioned whether it was a matter of not having access to affordable, healthy, and authentic food in the community. If so, how could they help address that issue? The students thought that if people could grow their own food, they could generate their own supply and not worry about how and where to get their food. What could they do to help increase the availability of fresh food to the local residents? They wanted to explore this possibility.

Based on their experience with simple hydroponic gardening, students started researching and comparing a variety of ways to supply fresh vegetables to the community. The community organizers and higher education institutions were brought in to provide support in researching and identifying necessary resources for the students. Every day the students spent hours doing research in small groups. Each group established goals, investigated how to implement their plans, and scrutinized what real impact they would have on the community. For example, a group of students proposed to build a rooftop garden on the school building to increase the vegetable supply. In order to decide which system they wanted to put in place, they examined the productivity of soil-based gardening versus hydroponic gardening for the vegetables

they wanted to grow. Another group wanted to convert empty lots into community vegetable gardens. They investigated the cost and the environmental impact of urban vegetable gardens. Another group wanted to have a greenhouse at the school for a year-round supply of fresh vegetables, and they examined how to build it and how to secure funds for it. Yet another group wanted to start a farmers' market to stimulate local vegetable growing. They studied the economic impacts of vegetable growing and the farmers' market for the community. They also looked into the possibility of bottling the vegetables, especially making sofrito sauce used as a food base, and investigated the social, financial, and biological aspects of food processing.

For their research/action projects, students used two plots at the community garden to investigate what was involved in growing vegetables in and around the community. To test out their vegetable growing schemes, the students grew several vegetables with important ethnic significance, such as green chilies and cilantro, which are ingredients for salsa sofrito. The teacher and students faced various obstacles along the way, however. Growing Puerto Rican vegetables in Chicago weather without extensive farming resources was challenging, and the anticipated yield did not materialize. As time passed, some students' enthusiasm weakened.

While the students did not succeed in supplying fresh ethnic vegetables to the community, the project worked as a platform for the community to talk about health and food security. As students were tending the garden, the community members came out to share their concerns over food security and poor health situations and contributed to weeding and watering of the plants. Students also made a Puerto Rican dish with the vegetables and shared the food at a community club where they presented their research results. Many community members came out to the event and supported the students' projects.

Researchers' Roles

As participant observers, our visits to the school involved the Biology class, but also History and after-school programs. We visited related sites, such as the community garden and the farmer's market. We also conducted informal interviews with students, teachers, community leaders, and other university-based collaborators, such as Michelle Torrise (2010), who played a more active implementation role. In addition to relying on direct observation, we crucially drew from a growing body of literature about the community, the high school, and projects there, including the urban agriculture project. This paper synthesizes these findings, seeking to understand its implications for curriculum and instruction.

Analysis of Urban Agriculture Project through Dewey's Framework

Relevance

Initiation of Inquiry based on Students' Experiences outside School

The students initiated this project after recognizing some fundamental problems in the community—gangs, poverty, food security, and poor health conditions. Their understanding of the problems was concrete and real because they had or knew someone who was affected by these problems. The issues, threatening the integrity of their daily lives, were significant and relevant parts of students' experiences, and the students were motivated to do something about these problems to change their living conditions.

In this problem recognition process, the family-like school environment helped students share their significant experiences with teachers and contributed greatly to the launch of the urban agriculture project. The teacher was able to turn the students' initiatives into a series of activities so that they learn how they could use scientific

investigation to address those issues. But if the students had not been able to openly discuss gangs and their living conditions with the science teacher, the project could not have started.

Often science teachers focus on 'science matters' such as photosynthesis and controlling variables because they regard their primary responsibility is to pass on scientific knowledge and process skills. They do not openly talk about students' nonacademic issues in class, such as gangs and food security. It does not mean they do not care about their students. The nonacademic issues are regarded as matters for the school counselors or outside science curriculum because of limited class time, privacy concerns, or the uncertainty of success in such discussions.

At PACHS, however, the science teacher was deeply involved in the students' lives, along with the school counselors and other subject teachers at the school. The teachers knew many students were struggling with serious life challenges, as they themselves had experienced as former students of the school or as community members. The teachers thus conceptualized teaching as a means to help a variety of the students' life challenges. They actively encouraged students to talk about important matters in their lives—through school assemblies, individual counseling, and discussions in science class. Because of the teachers' strong engagement and their understanding of students' life experiences, the students regarded their teachers as one of them, people whom they could confide in about important matters.

Understanding students' nonacademic, social experiences was not only a means for the PACHS teachers to build rapport with students; it was the foundation for their teaching, from where they can encourage students to investigate significant problems of their own and make science learning meaningful. Understanding students' experiences as a critical component of creating meaningful science learning environments, the

teachers at school re-conceptualized the boundary of science teaching to include the enjoyments and challenges in students' lives.

Lesson Planning with the Community's Resources

While the students' inquiry appears to have arisen spontaneously, the teacher planned and prepared a series of learning activities in advance to guide the students effectively and link the activities with the science curriculum. Based on the students' interest and excitement in growing plants from hydroponic gardening from the previous school year, the science teacher met with the community members to plan related activities for an urban agriculture and social ecology project, a project they had been thinking about doing before. The community members and the teacher understood that doing an urban agriculture project would provide an opportunity for the students to participate in a community action and to understand their community better, in terms of their culture, healthy diet habits, and environmental issues. They were aware of the international urban agriculture movements to increase food security for low-income urban neighborhoods, make the urban environments greener and better harmonized with nature, and help improve the poor health conditions (obesity, diabetes, and heart disease) of the residents (Corrigan, 2011).

Over the summer break, the plan for an urban agriculture project started to take shape. With the help from higher education institutions, a wide range of curricular activities and further investigation areas were identified. To enable a community garden project, a funding proposal was submitted to buy the necessary gardening equipment.

Although the teacher had a tentative plan for the project, he did not hastily present the topic to the students and pressure them to get involved. Rather, he carefully staged the urban agricultural project. He first introduced a rudimentary hydroponic garden unit to bring out students' interest in gardening and urban ecology. As the

students enjoyed the observation of plants and wanted to test hydroponic gardening versus soil-based gardening, he initiated a discussion of community issues with students. From the many issues plaguing the community, he narrowed it down to food insecurity and steered the discussion to what they could do about it. He demonstrated the link between food security issue and students' interest in gardening. Then, he helped them inquire an urban agriculture project further, in relation to science, environment, and community development.

As the teacher knew the topic was relevant and prepared a certain amount of educational resources, he was able to bring together confidently the students' individual interests in gardening, the community's need for food security, and the school subject matter. Dewey (1902/1976) knew that the curriculum needs to have an organic connection with the students' experiences, and teachers need to provide a rich environment for students to develop their individual interest in harmony with their social interest. Although the teacher was not consciously following Dewey, he artfully brought forth students' interests and facilitated the engagement in a community-based inquiry project so that students could connect with both the subject matter and the community.

Participation

Students' Participation Modes through Various Challenges

Many students enthusiastically participated in seeding, planting, watering, and tending the plants in the community garden. When they went out to the garden, they would get their hands dirty and observe the plants closely. When they found something growing, they got excited, and continuously asked questions. They were curious about many things and had many discussions.

Different from the initial small hydroponic gardening, there were many unanticipated challenges in growing the plants in the community garden in Chicago. For example, the students found that bugs and diseases were eating the plants. The plants required more watering than they had expected. There was no irrigation system in place, and a drought occurred, making it necessary for the students to haul buckets of water to the site. The plants they chose required not only water but a lot of sun. Because the weather in Chicago was quite different from Puerto Rico, the plant yield was poor. In addition to the general issues of gardening, the students faced other challenges. Some fruit in the community garden was stolen one day, and some plants were vandalized on another day. The students were upset and discouraged. They were not able to understand why some people would do such things when they were trying to do something good for the community.

Those challenges thwarted the initial inquiry efforts. They also presented valuable learning opportunities, generating a series of small inquiry projects. The students discussed how to diagnose and treat the diseases, the benefits and the dangers of using pesticides, how to manage the soil, and ways to increase yields. They learned about water shortage and changing drought patterns, and how they could help deal with other global environmental issues. They talked about how to productively manage collaboration and how to negotiate with other members of the community to find resolutions.

When solving a real-world problem, we naturally face small and big challenges. The upside of having such challenging experiences at school was that the students had their teacher and friends to discuss and find resolutions more collaboratively and systematically, thus building the knowledge and skills necessary for community-based scientific inquiry.

The majority of the students continued to participate in the project with enthusiasm despite the challenges. However, some students lost interest over time. To re-engage those students, the teacher assigned them a variety of physical tasks for tending the garden, such as hauling water or pulling weeds.

There could be multiple explanations for this reduced participation. The challenges could have been simply too complex and lengthy for the students to keep motivated. The students could have been too pre-occupied with their personal problems to stay focused.

Referring back to Dewey's theory of inquiry, however, leads us to ask what inquiry those non-participants were engaged in. Because learners possess diverse experiences, their interactions with the situation could be different from what the teacher and students themselves initially planned. Some students might have had different interests or immediate personal concerns that were not aligned with the urban agriculture project, but there was not enough allowance for individualized inquiries for those students whose focus or needs were not aligned with the whole class project.

The teachers at PACHS were effective at communicating with students about their communal concerns and deciding on which actions to take with students. It was the intention of the teachers to help students collaborate with one another to reach a common goal. However, the majority of the inquiry projects at school were organized as a series of whole group activities, without allowing individual students to take their own personal approaches.

While the urban agriculture project started out organically, the process of completing the task did not accommodate the different modes of participation of students, partly because the school did not have the resources that would allow individualized inquiries, like Dewey's Lab School (Mayhew & Edwards, 1936/1965;

Tanner, 1997). Also, as a teacher, it is often difficult to let go of the control of class activities, especially when students' inquiries are different from our planned activities and we do not fully know where their inquiries would lead them (Osborne, 1998). Dewey urged teacher's openness of mind toward the students' ways of addressing a situation: "The teacher who does not permit and encourage diversity of operation in dealing with questions is imposing intellectual blinders upon pupils—restricting their vision to the one path the teacher's mind happens to approve" (Dewey, 1916/1980, p. 182).

Collaboration beyond the School

The school personnel and the students always regarded the immediate community as their primary partner, audience, and resource. The urban agriculture project was no exception. Not only did they start out the project based on a community problem, they also surveyed and worked with other community members to determine the needs and means of vegetable gardens. They used a community resource, the community garden, as their field site to experiment with gardening. Members of the community also helped with weeding and watering the plants in the community garden. Students presented their research results in front of the community outside school.

The students realized that this learning was not only for their benefit; it was to become the groundwork for a larger community project. Community members would face the same problems if the students' campaign succeeded and the community started growing their own vegetables. The students' discussions and resolutions of the encountered problems could be used as a valuable knowledge resource for the community to draw upon, as the students were doing the initial explorative work for the community's gardening project. For the students at PACHS, the community was the central and integral part of their curriculum.

The PACHS teacher and students also worked with outside organizations for this project. The collaboration with higher education institutions enriched the activities in multiple ways—they brought in human and material resources to enable the school to plan and execute the urban agriculture project and related activities. For example, one of the university partners helped the teacher search resources for the hydroponic garden unit and examined the potential learning activities in relation to the state science education standards. A graduate assistant also helped with the students' research and amalgamating their findings during the multiple interdisciplinary projects (Torrise, 2010). For the curriculum development, a nearby college offered a course based on an advanced food and health study for the PACHS students.

Significance

Changes in the Situation

The urban agriculture project started out with the recognition of food inequality and insecurity as a communal problem and aimed to afford the community more control over the production and distribution of healthy, nutritious, and inexpensive food. As research studies have found, community garden projects often have the recognizable health benefits, such as supply of fresh vegetables, and providing physical exercise opportunities (Armstrong, 2000).

Although the students and the teacher worked diligently on the project, the immediate effect on the community was not clearly visible. For example, at the beginning of the project, the students thought they could grow and sell 'tons of vegetables' to the immediate effect. Because they were inexperienced in farming and the community garden plots were small, they were not able to achieve that goal. In fact, they sold the vegetables after harvest at a farmers' market one day and earned only $20.

It was a humbling experience for the students. Farming was not an easy job, and their enthusiasm alone did not make fundamental changes for the community.

Such difficulties and disappointments might be the very reasons why most teachers do not engage students in tackling critical questions of community, but direct them instead to a simulated problem of the outside world. It might have been prudent to provide a realistic view on the expected outcome of the project to the students at the outset. However, it is doubtful that students would have been emotionally and intellectually involved in the process without such anticipation to solve a real community problem. It is also very important for students to experience 'non-success' and identify ways to improve the outcomes.

While they did not achieve many visible changes, they did achieve what numerous other community garden projects fail to achieve—politicizing the food inequality and understanding social and economic issues around gangs. Weissman (2015) notes the majority of people involved in urban agriculture programs in the U.S. recognize that the youth education component is the most important aspect of their programs. However, he criticizes that many urban agriculture programs focus on the importance of individuals making smart choices for healthy eating habits, rather than collective, critical perspectives on food inequality as the main message of the programs.

The teacher and students at PACHS are still working at the garden and researching more questions to address the social food inequality issue. The students further investigated the soil—its pH, nutrient compositions, earthworms as fertilizer, making compost, etc.—in order to increase the yield. The teacher continued developing and revising a curriculum for new students, integrating the urban agriculture theme in the context of social ecology. It was an interdisciplinary curricular theme to extend their inquiry. Many class activities and discussions were constructed based on the urban

agriculture theme for the students to gain an environmental, economic, and sociological understanding of the community.

Students' Experience as the Goal

Science educators consider using everyday phenomena to explain science concepts. However, such a strategy only focuses on showing a small part of the link between science and everyday experiences. The urban agriculture project at PACHS, in contrast, aimed at a different kind of appreciation of science in students' daily experiences. The meaning making of their life experiences was the driving force and the goal of the project. The experiences were closely examined to identify the problem, actively explored to effect change, and critically reflected to make further changes. Students' experiences were not just a device to teach science concepts. Rather, they were the goal of the students' inquiry-based learning. Science was a resource to help them understand a community challenge and act on it.

This community action approach to science pedagogy is not widely employed. However, if we define scientific literacy as a skill set to make sense of the world and live effectively in society, we need to provide opportunities for them to learn and use science in/for their lives (Eisenhart, Finkel, & Marion, 1996; Roth, 2007). As the urban agriculture project demonstrated, a community-based, problem-solving project yields such possibilities with its strong connection to students' everyday experiences and with the alignment of individual and social interests (Burr, 2001; Cummings, 2000; Giles & Eyler, 1994; Kahne & Westheimer, 1996; Saltmarsh, 1996). Rather than focusing exclusively on transmitting science concepts or skills, science educators need to seriously consider community-based learning opportunities so that students experience the benefits and consequences of science learning on their lives.

Discussion

Urban Agriculture Project at PACHS: Investigating a Significant Problem for Community Action

The urban agriculture project at PACHS cannot be understood separately from the school's involvement in various community actions because the school had been functioning as the social center of the community (Benson, Harkavy, & Puckett, 2007). The integration of the community's needs into school learning was systematically built in the school atmosphere. This urban agriculture project was also drawn from the community's needs and the students' experiences. Because it dealt with a significant problem in students' lives, and most of the students enthusiastically participated in the project, it would display relatively high relevance.

The project, however, did not prove to be straightforward. The students faced a series of difficulties, and they had to devise ways to address them. The problem-solving process was challenging, but it turned out to be a learning opportunity for them to study plants, farming, and the environment more closely. It also drew collaboration with other community members and outside organizations. Although the project involved multiple activities to reflect emerging questions, there were still some nonparticipating students—maybe because they were not able to investigate different questions or contribute to the class in a different way. If there had been a more delicate balance between individual and group projects in the class, they could have engaged in more meaningful learning through productive participation.

While the project was much anticipated, it did not yield many visible changes by the end of the year. This was not because the students and teachers did not work hard on it, but the question had a different quality, and thus the transformation of the situation could not result in a similar form. Although the project did not immediately improve the

quality of life for for the community members, the students' efforts contributed to the community's knowledge resources as part of an ongoing continuous endeavor to build a better community and improve the life of community members. The students carried on their inquiry with refined questions, and the teachers developed more curricular resources from the project.

The power of relying on students' lived experience is evident in the urban agriculture project at PACHS. Students begin with immediate engagement in learning and build upon their ordinary experience. Moreover, as the project evolves into community action, they can see the consequences of otherwise abstract conceptions.

However, an obvious problem confronts anyone interested in the broad range of students and schools: If the approach relies on specific lived experiences, isn't it doomed to be location specific and non-transferable? One is reminded of Gale's (2006) critique of Dewey's theory of inquiry. He argues that since Dewey's theory relies upon the notion of situation, which he conceives as unique and therefore ineffable, collective inquiry, transferability, or even general knowledge are impossible.

The transferability problem exists even within PACHS. Can the lessons of the urban agriculture project be applied to other topics? Can they even be extended to next year's students? The answer here is twofold. First, each situation is unique and one should not expect to examine what PACHS did with urban agriculture in a given year and replicate it in another situation, especially one that differs in crucial ways, for example, in a rural setting, with younger or older students, or with different cultural histories. On the other hand, the general process of building science curricula out of community needs, knowledge, and values does seem replicable. This has been well-documented in a variety of settings (e.g., Bouillion & Gomez, 2001; Moll, Amanti, Neff, & Gonzales, 1992; Oakes & Rogers, 2006).

Adopting Dewey's Theory for Curriculum Innovations

Using Dewey's theory of experience and inquiry, this paper examined the educative value of an urban agriculture project at PACHS, along the way questioning some contemporary goals of school education in terms of the growth of students and community. Stretching the limits of conventional school practices, the students and teachers at PACHS actively embodied Dewey's educational visions, in terms of relevance, participation, and significance. They investigated students' shared concerns in the project and revised the school curriculum to encourage students' integrated understanding of the environmental, economic, and sociological issues of themselves and of the community. They collaborated with one another, with other community members, and with academic faculty members from local higher education institutions. They also attempted to effect significant changes in their lives and in the community, by trying out multiple strategies to make the urban agriculture project successful and initiated discussions with other community members on poverty, food security, and health.

Tempted to applaud the innovative approach at PACHS, readers might still wonder how feasible it is to adopt in mainstream schools, especially in the era of accountability and high stakes assessments. How dependent is it on the school's unique history and practices?

Deweyan inquiry as described in this study can be frustrating (Boostrom, 2016; Cunha, 2016). It may seem removed from immediate teaching concerns for two contradictory reasons: First, it is abstract, offering little guidance on practical issues such as what materials to employ or how to organize class activities. Second, a worked-out example such as that at PACHS, seems so embedded in its cultural-historical circumstances that it is hard to translate its insights to another setting. Dewey

recognizes those contradictory pulls, examines them in detail, but offers no easy resolution. Instead, his theory, augmented by the analysis here, reminds us that supporting learning though inquiry means finding situation-specific ways to enhance *relevance* (relation of activities to learners' experiences), *participation* (mode of learners' engagement), and *significance* (impact on learners' individual and communal life). PACHS shows us a proof of concept, one way to achieve that for a particular group of students. In doing so, it reminds us that good teaching will always require creative inquiry itself.

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