Design, Making, and Homesteading: Middle Schoolers Address Issues of and Solutions for Food Systems

Tarrence Banks PhD
The Project School
Bloomington, IN
USA
theprojectschool.org
bankst54@theprojectschool.org

Scott Wallace
The Project School
Bloomington, IN
USA
theprojectschool.org
swallace@theprojectschool.org

ABSTRACT

Students in a mixed grade, multi-age classroom engaged deeply in a year-long study investigating the unintended consequences in the food production and distribution systems in the United States. Students worked as consultants and found "clients" in the community who were looking to incorporate elements of *homesteading* into their lives. Working for and alongside their clients, the students set out to meet their clients' needs but also to determine if homestead living could potentially mitigate or solve the problems associated with traditional American food systems. This project demonstrates that it is possible to fully integrate a design and maker-centered curriculum that aims to solve problems with environmental and social implications. Additionally, crowdfunding in which the school took on no financial strain made this project possible and community members benefited in perpetuity from the students' work.

Keywords

Food systems; sustainability; justice; design, design process, design thinking; urban homesteading; crowdfunding; maker-centered learning; project-based learning

2. DESCRIPTION

2.1 Description of your setting

The Project School (TPS) is a K-8 nonprofit free chartered public school with independent board governance. Classrooms span multiple grades and are co-taught by two teachers per classroom. TPS's founders were educators with essential core beliefs such as empowering students and their families, valuing all members of the school community, creating individualized educational experiences, teaching for heart, mind, and voice, and creating educational equity. This philosophical stance is infused in our school. Social justice and environmental sustainability are paired with educational excellence in our classrooms, curriculum, family programming, and events.

FIGURE 1. Open-space classroom configuration with integrated makerspace

Curricular framework: Problem, Project, and Place-based learning

The Project School utilizes a uniquely designed curricular framework: *problem*, *project*, and *place*-based learning (P3). P3 ties together the hard sciences, social sciences, history, and civics with our interdisciplinary reading, writing and mathematics curriculum, which directly connects to issues in the local and global community. Students, teachers, families, and community members work together to arrive at school-wide topics and essential questions that guide individual, group, and community projects. Students understand that they can make a difference in their communities, and the community sees the school as a force for social justice.

Maker-centered/hands-on learning environment

Our classrooms are fully inclusive for students of all abilities and needs and are designed as multi-age, co-teaching spaces to allow for peer leadership and mentorship. The educational experience described in this paper happened in our middle school classrooms. TPS's middle school classrooms have an open configuration with an integrated *makerspace*. This *makerspace* has a tool station, textile screen printing machine, 3D printer, and laser cutter (see Figure 1). In recent years, we have partnered with faculty and students from Indiana University School of Education. These collaborators have provided, not just tools and materials to create a makerspace for our school, but innovative practices, and support with implementation and professional development on emergent technologies.

2.2 Description of the educational experience

Students in the 7th/8th-grade classroom at The Project School have come to expect a certain level of experience during their time in the class. Each year, the class engages in a yearlong exploration of a large issue integrating design and social and environmental justice. Annually, we (the teachers) feel a pressure to "top" what they did in the previous years as students excitedly exchange thoughts and ideas about what the topic will be. In the 2017-2018 school year, we (the authors) developed a unique experience in which students returned to their "roots" and explored the *connections* between food, society, and economy. We focused on food, food production, and food supply chains, as issues related to food and sustainable agriculture are recurring themes in our *Curricular Summits* (annual meetings to determine the direction and focus of each year's curriculum). Bloomington, IN is a mid-sized city with a large public University at its core. Deemed by some a "progressive island" in a largely conservative state, it is surrounded by largely rural and diverse socioeconomic areas. Given this

cross section, there is also diversity in access to and feelings about food and food production. As a result, our students could immediately and intimately connect to issues related to food. We also wanted a focus that would allow our students to develop real solutions they could design, build, and implement in the community. This led us to the idea of *urban homesteading* as a practical and tangible solution to critically analyze and evaluate for relevance as a potential solution to food system issues. For the purposes of an overview of the project, it can be broken down into the following three phases:

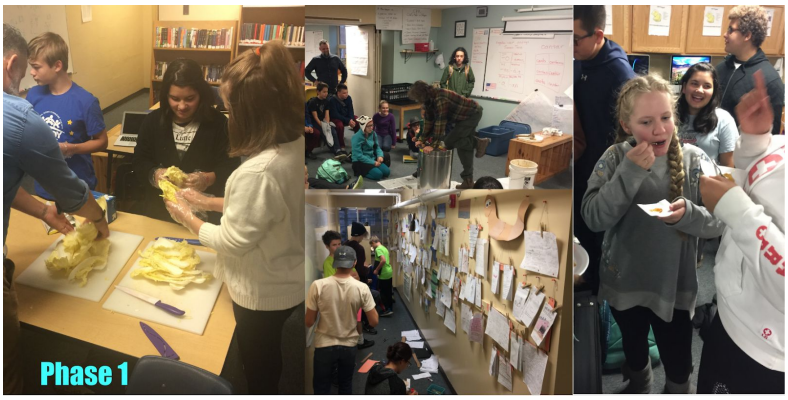

FIGURE 2. Students learn about homesteading elements

Phase 1. We began the original research of the project by helping to define what it means to "homestead." We narrowed the elements of homesteading down to six projects, with the intent of having at least one group of students working on each kind of project. They were *vermiculture* (worm farming), *apiculture* (beekeeping), *raising chickens*, *food preservation*, *gardening*, and *rooftop water collection*. Students engaged over a series of weeks with articles, books, videos, and podcasts about each of the homesteading practices. For each practice, students created a 'Performance of Understanding' where they demonstrated mastery of the basics of each homesteading practice. Concurrently, through social media, we actively sought participants to act as "clients" and investors in the project. We were pleasantly surprised at the level of interest in the project. We knew we would have ten group projects and were happy to have over 60 families express an interest in working with our students. It was clear to them at the time of signing up that they would be funding the project and that it would be student-driven in every way.

Phase 2 Once students demonstrated a basic understanding of each homesteading practice, we asked them to do a series of reflections about what they had learned as well as the skills they brought to the project. Students completed an 'Application Survey' where they ranked their choice of homesteading element and applied for one of four team roles: Team Leader, Historian, Mathematician, and Technician. Based on their preferences and what we knew about them as students, we created heterogeneous groups of six students and assigned a staff member from the school to each group to act in a supervisory capacity. Using the student groups and their preferences, we then selected ten clients to welcome into the project and make a homesteading investment in their own properties.

FIGURE 3. Students meet with clients and make murals

Once matched, students and clients met for design consultation meetings. The first meeting allowed for the clients and students to meet each other and the student designers prepared questions for the client about their hopes, context, and budget for the project. Once completed, student designers made three complete design options for presentation to the clients in the second meeting. In the second meeting, clients were presented with the options and made a decision to move forward with one or to modify an option further. For the most part, each group's design choices provided the client with an economy, standard, and deluxe version of their homesteading project. In some cases, the client chose to combine and/or modify the choices to make a new, final design choice. From here, student designers and clients did not interact much until it came time to build. While waiting for the spring weather to arrive, student design teams worked to finalize their plans for 'Build Day.'

We also created curricular strands for addressing standards in literacy, science, and social studies. Examples include:

(1) ***Food Systems and Supply Chains:*** Students engaged in a text-based exploration of food and food systems anchored by Michael Pollan's (2006) *Omnivore's Dilemma*, and grounded in systematically reading, comprehending, and writing about complex non-fiction text. Using Pollan's ideas as a springboard, we took a deep-dive into framing and critically analyzing the issues we face related to food and food supply chains.

(2) ***Farm Labor and Cesar Chavez:*** This module was a humanities-focused study of farm labor with an emphasis on Cesar Chavez and the United Farm Workers Union, grounded in informational and argument writing. Students extensively studied the issue of farm labor and current issues *connected* to immigration. They took on multiple perspectives from the farmer to the laborer in order to better understand the connections between labor and food production and distribution.

Additionally, we collaborated with the arts teachers to make informational/activist murals that were hung in public spaces about the issues addressed through homesteading. Students designed and built 3ft x 5ft frames and stretched canvas to fit them (interestingly, the canvas was repurposed material from a previous project presented at FabLearn) and spent about 2 weeks working on the art. The goal was to inspire and inform the viewers of the importance of the homesteading elements.

Phase 3. All the hard work built towards a series of 'Build Days' at one the home of one of the teachers. We required a large amount of space to construct the projects, so much planning went into the days such that when students and materials arrived, the

construction could begin immediately. Ahead of a 'Build Day,' clients provided student designers with prepaid gift cards in agreed upon amount. Teachers and assistants drove students to the hardware stores over their lunch and recess breaks. One of the authors took the supplies home in the days and weeks leading up to 'Build Day' and stored them in the barn where much of the construction and storage would occur. Most excitingly, for the kids, we built a makeshift coop in the classroom and raised 15 hens in the classroom!

FIGURE 4. Students build and install homestead elements

Without exception, student after student spoke of the power of 'Build Day.' It was mentioned in almost every student's eighth-grade graduation speech. Students came together for a greater purpose and saw their months of work come to fruition. Installing and delivering these homesteading elements to the client was something that students had been working toward for the entire year. The amount of pride they felt seeing their designs to come to life was palpable and potentially life-changing for these children.

We discovered a key learning during 'Build Day': so much important design happens in the execution of the plan, even when one thinks everything has been planned for. Seeing students problem solve "on the fly" was exciting and inspiring as educators. When a joint would not come together correctly or a wall slanted instead of standing up straight, students had to put their heads together to fix it. We also saw students negotiating through the challenges of shared materials like drills, saws, and hammers. As groups needed expertise, they found it in each other rather than coming straight to a teacher or parent volunteer.

On the topic of volunteers, we could not have done this project on our own. We relied heavily on the relationships that have been forged over the years between our families and the school. Parents with incredible amounts of expertise were on hand, sometimes for multiple days at a time, helping students and teachers work through the complexities of a project like this. Examples include a dad who is full time professor in Studio Arts at the local university, a dad who is the set designer for the university Opera department, and a parent who is a full-time homesteader. Parents who volunteered but did not have specific skill sets in homesteading or construction were also invaluable. We sent parents time and time again to the hardware store or loaded their vans with droves of students. The importance of those healthy relationships with families cannot be overstated.

3. CONCLUSION

3.1 Results

Authentic and Impactful Community Connections and Creative Crowdsourcing: While there are numerous student learning outcomes we could highlight in this project, our main focus in the section and one that we believe has potential for other educators and our work in the future is around authentically connecting to our local community. In the past, one place we felt we have fallen short was around making authentic and impactful connections to our local community. Heading into this project we were committed to making these kinds of connections. We believe this is where the broader value and potential impact on education lies. For this project, we became designers for community members who were committed to taking steps to impact their own family or household food system by utilizing one the elements of urban homesteading we were studying. This was an intentional move to place the students in an authentic designer role. The connection to food systems and urban homesteading gave this project, and thus their work as designers, more meaning and relevance. At the close of this project, we could point to ten homes that had increased capacity to source their own food, or positively impact their environmental footprint. This tangible impact is one that we can point to, measure, and track in the years to come.

The students knew from the onset of the project that the stakes were high and their designs had meaning because their "clients" were quite literally crowdfunding the project. The total cost for this project was over $5,000 USD from beginning to end. This is a prohibitive cost for a school such as ours with limited funds and resources. In the past, we have worked with community partners and universities to write grants and secure funds for our projects. While this has been effective, it is cumbersome, time-consuming, and brings with it the red tape and bureaucracy that inherently (and justifiably) follows grant dollars. This project was fully funded by the clients themselves; the projects ranged from $80 to $800 when fully designed, built, and installed. This experience has helped us realize a process for funding projects that have been beyond our reach financially. While we believe this model needs work (described later) it is a model that we believe has the potential to open up possibilities for us and others looking to do this kind of large-scale project work. For next time, our work is to deepen these connections with the community and utilize this model in a way that can offset or cover the cost of design solutions for individuals and/or organizations who have a need but lack the resources to fund the solutions. This is big and important work for us in the future. How can we broaden access? How can we provide service at low or no cost to those who need it most? These are the questions we believe get at the heart of our work moving forward.

3.2 Broader Value

Bridging the Divide: Fully Integrating Design, Making, and Project-Problem-Place-Based Learning: For the past six years our teaching team has been working to create a fully integrated, project-problem-place-based curricular structure that heavily emphasizes and focuses on a design process, design thinking, and maker-centered learning. To date, this project is as close as we have come. Our work has been centered around pushing back on the notion that *making* and makerspaces have to exist outside of the classroom as classes in a

"special area" or in community centers and libraries. While we have no problem with makerspaces of this kind and nature, we believe that there is a way to bring the magic of making into the classroom. In order to help teachers utilize *design* and *making* to create highly engaging curriculum in their classrooms, we are operationalizing a fully integrated, design-focused, maker-inspired *curricular development architecture* that can be utilized in any setting. The main elements consist of focusing on the big ideas of *design*, creating space (physical and theoretical) for students to make and create, and identifying and placing emphasis on compelling topics and questions. We are excited to share our work and our journey with educators; it is our mission. This project illustrates that design can be the core focus of long-term, fully integrated, multi-disciplinary projects that are deeply connected to issues of social and environmental justice and are embedded in the local community.

Design for What? Design for Whom? This project allowed us to take critical steps forward in questions about why designers design and what and for whom we can and should be designing. Making authentic and impactful connections in the community has been a component that has been lacking or has fallen short in our project work in the past; previous projects included guest speakers or field experiences, but we weren't designing for real people with real problems. This placed a focus on the *empathizing* component of the design process, which gave their research and development more meaning. We have found with other projects and with our open-ended design studio time, that students often grow tired or bored with what they are working on well before the feedback and revision cycles in the design process. This client connection and relationship, developed by the structure of client meetings and communication enabled student teams to naturally engage in a feedback cycle that required them to take into consideration client feedback and modify their plans accordingly. This also took the emphasis off of individual student ideas (often a tricky proposition with middle school students) and placed it on achieving the client's goals. This project created a healthy level of what we referred to as *adult level professional pressure;* student teams were working to nearly (literally) the last days of school to deliver a high-quality product to their clients. While our projects, because of our P3 curricular framework, inherently have a focus on environmental and social sustainability and justice, these connections to the community made this focus authentic, meaningful, and high-stakes.

Real-time Design and Problem Solving: An unexpected outcome of this project, and one we want to bring forward and study more, is the idea of real-time design and problem-solving. As outlined above, our students engaged in multiple offsite build days where community and family volunteers and teachers collaborated with student teams to bring their designs to fruition. We knew problems would come up and plans would have to be modified, but we did not expect the level to which this would occur. Time and time again during these build days adults and students worked together to fabricate solutions, improvise, redraw plans, and pose solutions to the problems that came up. In one instance, a parent volunteer listened to the students' ideas around design modifications, took the plans home and reworked them in Google Sketchup, brought them back the next day, and worked with the students to understand how he turned their ideas into a new plan. There were countless examples of real-time design during these days, some we were able to capture, but others were likely lost. We believe this is significant for this kind of work and we are eager to share this with others, as well as gain insight into how to formalize structures to capture these moments.

3.3 Relevance to Theme

We are progressive, experiential educators with a deep belief that students will construct knowledge, meaning, and understanding when they engage in authentic experiences centered around complex issues that we, as humans, are toiling with. Our belief is that while knowledge is acquired through a multitude of experiences and reflection upon those experiences, the *school experience* is one that should be structured around authentic, experiential, and multidisciplinary learning centered around important questions, problems, and projects that interrogate, analyze, and reflect upon the relationship of humans with the earth, all its living systems, and each other. The philosophy and approach that most closely aligns with our beliefs and epistemology is project-based learning (e.g., Blumenfeld et al., 1991) that is focused on issues of societal, economic, and environmental sustainability. Our experience tells us that when students are given a properly structured project, they can come up with inspiring work. We feel most alive as teachers when we help our students struggle through problems that matter. We know this section is optional for educator submissions, but the conference theme literally drives all we do in our classroom. In our classroom and school, we utilize the principles of sustainability and sustainable development when creating projects. We intentionally focus on the intersections between environment, economy, and society and teach the concepts of resilience, equity, and justice. This project exemplifies what we believe about curricular focus on social and environmental justice.

4. BIOS

Tarrence Banks *(Panel Member)*. Tarrey is a graduate of Butler University with a B.S. in elementary education. He received his MA in school administration from Indiana University and his Ph.D. from Prescott College focusing on sustainability education. He began working with The Project School Founding Group in the fall of 2006, and is on the 7-8 team focusing on humanities and P3.

Scott Wallace. Scott has 11 years of experience as a classroom teacher. His BS in Chemistry is from Lebanon Valley College (Annville, PA) and his MAT in Chemistry is from Indiana University (Bloomington). He is currently pursuing his building level administrator license. He loves all things "techy" and dabbles in homesteading on his property in rural Indiana.

5. REFERENCES

[1] Pollan, M. (2006). The omnivore's dilemma: A natural history of four meals. Penguin.

[2] Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. Educational psychologist, 26(3-4), 369-398.