SENSING SOIL

Public Design Workshop | Fall 2011
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What is the question you are investigating through your project and how?

How can the average urban agricultural novice approach and optimize compost development at a small scale in a way that utilizes and balances both available qualitative and traditional quantitative methods? The goal of our project is the investigation of small-scale composting through design research.

Identifying problems

We identified the problems people face when they initially launch composting and farming practices in their own backyards. The problems are roughly categorized into two: context and techniques.

To understand the current view of composting and community awareness, we performed context research through interviews with agricultural specialists, such as a manager at the Atlanta Botanical Gardens as well as a DeKalb Master Gardener who both have made composting a priority in their jobs. We also reviewed past design projects related to composting and urban farming with the intention to identify the spaces where design research (either as practice or critiques) can contribute to small-scale agriculture.

Process of home composting

To understand inexperienced farmers' technical obstacles, we ourselves maintained a compost bin. After first researching and synthesizing the chemical requirements and environmental conditions necessary for good compost from a variety of online and print resources, we set up a compost bin meeting those conditions and launched it as a prototype of small-scale agriculture.

Visualization of data

The final segment of the project required taking the data and displaying it in a way that helps explain how compost structurally forms over time. It was critical to provide an accessible online resource that meshed our preliminary research and final findings into one, streamlined presentation that was approachable and interesting to amateur and practicing gardeners. Acknowledging our personal research hurdles that required us to pull information from several places, it is our intention to offer a single location for quick compost start up and confident measuring that empowers users to follow through on their wishes to regain control over the farming practices of the fruits and vegetables they consume by starting at the fundamental step of understanding and improving the very soil in which those fruits and vegetables grow.

How is this connected to a real-world farming practice or context?

Even while embracing an urban lifestyle, many city dwellers are interested in locally grown and organic vegetables and fruits. Beyond personal or morally based preferences to pursue a sustainable diet, some are eager to grow and maintain their own private, harvest-producing garden. However, there exist obstacles for the small-scale home farmers, especially first-time practitioners: insufficient knowledge of composting sciences and technology, lack of resources or space limitations for composting materials, and lack of comprehensible, standardized measurement of maturing compost.

Our project of composting and sensing is ideally suited for the urban context in which individuals may develop their own compost at their residence and grow vegetables and fruits for non-commercial purposes. By documenting the process and techniques of composting, we are equipped with the resources necessary to provide city dwellers with the tacit knowledge currently lacking in small-scale agricultural information networks.

How does your project make use of the affordances of digital media?

Our design project exploits digital media in both phases of production and exhibition/distribution.

Sensing compost

We utilized a range of sensors—among them thermometers, nitrogen strips, and an Arduino-tracked humidity/thermistor meter—to accurately capture the subtle chemical changes compost undergoes as it develops. In addition to quantitative sensor data, we also recorded qualitative observations through our senses: sight, smell and touch. Pairing these observations with the quantitative measurements enables the final presentation to honor the traditional agricultural education practice that worked so well for so long and allows that same practice to prosper through its direct connection to specific measurements.

As a way of documentation, we take pictures of composts, sensors, and environments on a regular basis. We also share the photos on a photo-sharing site, and the sensed data are stored in an online spreadsheet shared by team members.

Sharing knowledge

The final presentation also utilizes digital media in its telling. The end result will consist of a navigable website that provides for a broad range of access for those interested in or curious about starting composting bins of their own.

The traditional method of composting is vernacular based and relies on specialists' experience. Compost maturity is gauged predominantly using simply sight and smell, with the occasional addition of analogue sensing devices such as a thermometer. Novice home-based farmers are not equipped with such tacit knowledge, and it can be difficult to convey "the soil should be moist" in a way that even established agriculturalists can fully comprehend.

You can't replicate something that "smells like lettuce." You can, however, add in more leaves to boost nitrogen levels. The use of digital devices to track measurements allows us to be more specific, exacting, and affords us the ability to present an approach of compost creation that is easily replicable.

How does your concept circulate through the design community and through the small-scale agriculture community?

Since we exhibit the results of sensing data on a website, it is accessible to anyone with Internet access, including designers and small-scale farmers.

Small-scale agriculture community

There are many possible platforms to share this information, including the historical and long-standing peer-to-peer transfer between established and beginning agriculturalists, but for a target user base that has little to no experience in the garden and likely few experienced peers, the Internet is the typical primary resource. Before buying tools or plants, before thinking about how to best use the space of small apartment patios or building rooftops, the web is a go-to planning destination for burgeoning gardeners. Providing an access point online where the information on bin set up, compost requirements, and ideal measurement ranges are all in one place makes the journey of becoming a thoughtful, soil-conscious gardener that much easier and more worthwhile.

It was a purposeful decision not to incorporate this information into an existing site (i.e. Instructable or YouTube video) as our personal research did not surface a focused area of social activity regarding urban gardening among our target users. First-time farmers are more likely to take to the Google search engine than any other specific community, and we want to meet them there with a robust and comprehensive composting information site.

Design community

In a digital world facing HTML5, type embedding, CSS3 and advanced browser support, there is more flexibility in online design than ever before. Fancy advancements do not a strong presentation make, but our cursory research indicated resources for setting up a compost bin were disjointed, dated and required synthesis. We are in the unique position where our urban target audience, with a market-trained attention to detail and demand for sophistication in information transmission, is arguably a design community in itself. Through building a well-designed composting resource, we are stepping up to meet the expectations of the user base, upon which it is more possible to gain audience traction through social media sharing generated by site viewers.

More importantly, why should designers care about this project? It serves as an example within the design community of 'design through practice,' where the designers learned by doing. The project underscores the importance of 'being' what you are studying. It is difficult to fully comprehend a user's challenges without taking on that role and encountering them yourself. We can be distant observers as qualified researchers, but at

times a measure of empathy lends an earnestness to the work. It grounds it in practical application. In this case, literally getting our hands dirty was representative of the back-to-the-garden movement of the urban agriculturalists whose questions our project is aiming to answer.

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