
Gardening for Community

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Abstract

Local sustainability through community gardens.
Community gardens allow a group of people to grow their own food on a shared plot of land. This practice is sustainable because it does not inhibit current food production from being used by non-members and it is local because the food rarely leaves the community for which it is grown. We suggest that many of the current problems experienced by community gardens can be solved through a better community. In order to increase the size and strength of the community, and in turn the number of participants, we propose the use of an ambient device to inform garden members of the activity level in a garden. We believe that more people are likely to remain interested and active in the garden if they know that there already exists a community with which to share the experience.

Keywords

Sustainability, Community Garden, Ambient Technology, Local Resources, Heuristics Evaluation

Introduction

A community garden is “any piece of land gardened by a group of people” [1]. Community gardens are wonderful places which can foster relationships between people who would otherwise have never met. They allow a variety of individuals to come together as a community on a shared plot of land where members can grow healthy, sustainable food for themselves and for their community as a whole. Being part of a community such as this, would allow individuals to not only contribute to the community’s well-being, but also

acquire the knowledge necessary to raise their own personal garden, or even start additional community gardens elsewhere.

Community gardens are particularly useful in urban settings where inhabitants would like fresh herbs and vegetables, but space is at a premium. If a community garden is in a location which is convenient for potential consumers, perhaps they would be more likely to choose local home-grown food, rather than spending their time and money at a chain grocery store. This local and convenient food supply would allow community members to remain independent of foreign produce.

Sustainability is the practice of using resources to meet current needs without limiting future use [2]. If community gardeners primarily consume their own vegetables, this would leave a larger supply of non-community grown vegetables for non-members to have now, and in the future. In addition to supplying food directly to their members, community gardens also donate surplus vegetables to local restaurants and soup kitchens, further reducing the impact on non-local vegetable production.

With all of these benefits, it would seem that there would be more interest in community gardens than there currently is. Unfortunately, there are many problems plaguing this activity. Gardens are notoriously underfunded and there is typically a severe lack of volunteers. While there is nothing we can do to directly affect the funding problems, we have been able to find a solution to the deficient number of volunteers.

Many gardeners would often begin enthusiastically, but would soon become bored or lose interest due to the time and effort required. We believe that fostering a larger and stronger community among gardeners would solve all of these problems. We plan to do this through the use of an ambient system that we call the Jade Ambient Design Experience (JADE).

Research

Our research is intended to lead our design as well as justify it. We choose to focus on food because of Bloomington Indiana's enthusiasm and support of locally grown and sold foods. Bloomington has a notable and popular farmer's market which allows for nearby farmers to come together selling local food to local people. We find this to be sustainable because of its ability to provide food that was grown nearby [3] to people who live within the city eliminating extensive transportation of goods, which increase cost [4], and allowing consumers to experience local knowledge about those foods.

It is this unique atmosphere that led us to the Bloomington Farmers' Market to begin our research. Arriving early as vendors were setting up allowed us to conduct the observation on not just how the farmers interact with their customers, but also how they interact with each other before the day begins, noting the communication among vendors prior to the start of the work day. Farmers enjoy discussing their food with the vendors and are willing to share stories about their crops as well as answer any questions that their customers have. Our findings show that people who are interested in local food are enthusiastic about the topic and willing to share their trade secrets with others. Our observations point to this strong idea of community that exists in this farmer's market not just among those who have the knowledge of local food, but those who are interested in learning about it.

Through contacts made at the Bloomington Farmer's Market we have discovered a great number of community gardens throughout the city. Community gardens are defined as any piece of land gardened by a group of people [1]. The food that grows in community gardens is consumed either by the volunteers directly or by other local community members through donations to food banks or local restaurants.

By volunteering with the Oasis Project, a community garden started and maintained by students of Indiana University through The Center for Sustainable Living in Bloomington, we learned community gardens are hard work for the individual and therefore require a large number of volunteers to be truly successful. Our findings also show that in an unstructured garden such as this it is hard to get many gardeners in the garden at once.

Our research is further developed by an interview with an administrator from the Hilltop Community Garden and Nature Center in Bloomington, Indiana. We find that over time even enthusiastic volunteers lose interest in the garden. To further this problem we have discovered that gardening is hard work and requires the help of many, especially in the setting of a community garden. Because this is such hard work it is important to have more people returning to the garden to spread the work load making the tasks smaller and easier.

When looking for exemplars relating to community and connecting people we found the Nabaztag, a Wi-Fi enabled rabbit that uses ambient blinking dots to relay information from one rabbit to another [5]. The Nabaztag is a popular device used as a way to connect individuals together. We also want to look at what made other social groups work. Because a large portion of the success of Weight Watchers involves the continual return of the members of their system [6], we looked to compare our methods to those found within their program. We find members of their program often return to support group meetings through positive reinforcement and encouragement from mentors and peers. We specifically aim to consider the effectiveness of this motivational theory on our target user group, 30-40 year old adults who have full time jobs and lead fairly busy lifestyles. We found through primary research that this was the typical volunteer at the Hilltop Community Garden and Nature Center.

Furthermore we examined technologies that enable larger communities. Communities such as World of Warcraft, Facebook.com, and MySpace.com attract millions of users, and have high retention rates [7]. These examples of community have a common trait of allowing the user to see when their friends are present in that community. We want to capitalize on this trait to bring people together in the garden.

Volunteers are motivated by the needs of achievement as well as worth [8]. They want to feel good about the volunteer work they are doing. This connects directly to many of the goals of a community garden by giving the volunteers a place to learn, work, grow, and make a difference.

Problem Space

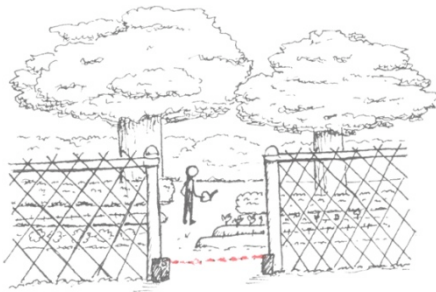
Stakeholders in local community gardens include primarily the volunteers on whose participation success of the garden rides. These volunteers receive not only food as the fruit of their labor, but also intangible benefits such as experiential knowledge, connection with other community members, a feeling of belonging to a community, and a sense of place. Other groups with stake in the success of a garden include local restaurants and local food pantries that might receive produce or herbs grown in the garden, managers of the community garden, government entities with stake in the success of the community in which the garden is located, and all members of the neighborhood or community surrounding the garden who benefit from beautification of community a thriving garden provides.

In the course of our primary research we found a variety of problem spaces, including the following:

1. Those who have not earned it sometimes take food from the garden.
2. Community gardens are commonly underfunded.
3. New volunteers lose interest over time.



Figure 1 – JADE



The first and second of the above problem spaces are somewhat inherent in the nature of a community garden, but we felt we could have some lasting impact in the third problem space, working to keep volunteers coming back.

The volunteer gardeners, experts and novices alike, are the life and soul of the community garden, without which the garden will fail. Gardening, novice volunteers quickly learn, is hard work, and there is a lot of it to be done. In gardens with individual plots this makes for a large time commitment, and even for gardeners helping in a communal plot the task of maintenance can seem daunting.

Through our secondary research we found that friendship is a powerful motivating factor, and that volunteers are more likely to stick with the program if they feel like part of the community [9]. Also, knowing that “as the number of friends one has in a voluntary organization increases one is more likely to increase his or her activity in that organization” [9], we can reasonably hope that by encouraging a sense of community and friendship in new volunteers, over time an increase in the number of returning volunteers will be seen. We therefore focus our design on fostering a sense of connection with the garden and the gardening community in order to make tangible the connection between the garden and the volunteer while connections of friendship and community might still be forming.

Concept

In order to realize our design goal of building community to encourage repeat visits of new volunteers, we decided to focus on bringing volunteers together in the garden where these lasting connections of friendship and community may be formed. By giving the garden itself a figurative voice with which it might call out for volunteers, we hope to provide new volunteers with an instant inside connection to the garden.

Our design, the Jade Ambient Design Experience (JADE), is an ambient device that could be placed in any plant, living or artificial. It ties a volunteer to a specific community garden, and indicates through motion sensors and wireless internet connection the level of activity within the garden. JADE could be placed in the home or office of the volunteer, utilizing a wireless internet connection to communicate with the garden's sensors. The motion sensors in the garden would be placed at the entrance, and monitor arrival and departure of large beings through the gate or opening. Even gardens that are not fenced typically have a single point of entry, or may be easily suggested through landscaping.

A higher number of people in the garden would cause JADE to glow brighter, and a low number would cause JADE to dim. Although the goal of the design is to motivate volunteers to go to the garden when others are present so that inexperienced gardeners may learn from other gardeners, if volunteers choose to go to the garden when there are fewer people present our cause is not lost.

The ambient design provides just enough tantalizing real-time information to entice volunteers to come to the physical garden space in order to find out more. The plant form of the design suggests a symbolic link to the plant life growing within the garden, and provides a pleasing and decorative memento of the garden in the home or office space. Placing motion sensors within the community garden allows for near complete transparency of the design on the part of the volunteers active in the garden, and prevents intrusion of distracting technology in this simple, organic space.

By displaying to new volunteers real-time information about the number of other volunteers in the garden, we aim to provide insight into the ebb and flow, the pulse so to speak, of the garden itself. This is the hypothesis we test with a short-term usability study and modified ambient heuristic evaluation.

Usability Testing

To inform our initial design concept, we conducted short-term usability testing, which included a modified ambient heuristics evaluation, before beginning a long-term usability study. Rather than recruit first from our target audience, we chose to recruit four of our classmates to participate in the usability study for two main reasons: impartiality and experience. First, most of them know about community gardens but have no preconceived notions as to how such an organization should function, so it is much easier for them to imagine themselves as volunteers in the type of garden for which we are designing. Second, they are experienced usability testers, and are therefore more capable of identifying the major problems in our design based on the ambient heuristic evaluations, which we modified from [10] and presented in the form of post-test questions.

We conducted each test as consistently as possible, and each of us held the same role for every session. The facilitator led the participant through a series of scenarios and questions to gauge their reactions to the device under different situations. The data-logger recorded the quantitative data, including the number of positive versus negative reactions and the participants' interpretations of the information being displayed. The note-taker recorded observations related to participants' body language and comments made when responding to questions. A visual data-logger recorded the session using a camera and video recorder, focusing on the participants' facial expressions, body language, and other details for later analysis.

In order to collect general demographic data from which to form user profiles, we asked a series of pretest questions related to volunteer and community garden experience. During the test we provided four scenarios based on different situations that might happen in the community garden throughout the course of a day as reflected by the ambient device. After presenting each scenario, we asked the same four

corresponding questions in order to gauge their reaction and also structure their responses. After each study session we asked a series of post-test questions. These questions were developed based on the ambient heuristic evaluation principles described in [10], where they were originally assembled to aid in finding major problems in ambient design with the help from experts. Ours were modified in the form of open-ended questions, as opposed to Likert scales or semantic differentials, to give the participant freedom to suggest improvement in each of these areas. Based on the participants' comments and feedback, and our analysis of the quantitative data, we found three major areas for revision to our design, including the amount of information displayed, the form in which it is displayed, and interaction with the device.

First, all four of our test subjects expressed a desire for more detailed information. They were told only that the plant indicates the current, general activity level within the garden. When participants encountered scenarios in which the plant was "glowing", they wanted to know exactly how many people were in the garden so they could gauge for themselves how "active" the garden really was. Some participants wanted to know whether their friends or experienced volunteers were in the garden, indicating they would be more inclined to take action and go to the garden to volunteer if they knew these influential people were there. In addition to participants wanting to know whether influential individuals were in the garden, some also indicated a desire to connect directly with these individuals, be they in the garden or not. Encouraging this volunteer to volunteer connection is not outside the scope of our design space as we aim to encourage connection with and expand on the gardening community and enhance the new volunteers' sense of belonging.

Because participants' were intentionally given a vague definition of what information the design actually provides, we found they were more motivated to visit the garden in different situations. Some were motivated

to go when the light is brighter, reasoning the bright light meant the garden needed help. Some who also felt more motivated to volunteer when the light was bright reasoned differently, indicating they felt drawn to the garden when other volunteers are present. Yet other participants' indicated they were more motivated when the light was dim, reasoning that the community garden is in greater need of help when few volunteers are there. We feel we need to clarify the information being portrayed in future iterations of our design, as misinformation could dampen the user experience; however, we are unconcerned by participants' actual time of motivation as long as they are in fact motivated to volunteer.

We also found that some of the participants want to have more interaction with the ambient device. Convenient off/on functionality, simple gesture controls, different light colors and patterns and sound were all features brought up by participants. These possible interactions will be explored in future iterations of the design.

Our heuristic evaluation was very successful in identifying major problems with the design but, due to the type of study we conducted, there were few positive attributes of the design to stimulate comment. The overall reaction from our experts was positive, though, as most indicated the device would perhaps help them feel more connected to the community of volunteer gardeners.

Considerations for Future Design

In future iterations of this design we will need to address the problems discovered during usability testing, including amount of information, form of information, and interaction with the device. In addition we would also consider other methods of implementation.

Our current design solution includes the use of motion sensors at the entrance and exit of the garden to allow

for the current number of volunteers in the garden to be automatically and transparently calculated. Unfortunately, these sensors have a notoriously high rate of false positives which could result in long-term calibration errors in the system. Some other input solutions that we have considered include simple mechanical turnstiles at the entrance and exit, or a series of small, natural looking motion detectors around the garden to detect actual activity rather than number of people, and video cameras which could detect both activity and number of people, given the right amount of software and calibration.

Once the information is in the system, we propose using a Twitter feed or other existing, free technology to carry that information to the plant. Another option would include a dedicated RSS feed. The plant would use an embedded wireless card to process the information and update its display. Both of these options, however, would require both the garden and the volunteer to have access to an active Internet connection. Using a low frequency radio transmission to send a radio signal to the plants would circumvent this problem, but this solution would need to be further researched and would most likely require government approval before being implemented. While a radio signal would limit the range that someone might be able to use the ambient plant, it would be the most direct, and independent solution. Using a dedicated cellular connection would take advantage of the cellular towers available, allowing the garden to connect directly to the plants. This solution, however, will require a great deal of cooperation with cellular providers and, most likely, a monthly service fee.

The actual form factor of the device was also taken into consideration. We considered using a real plant, but many testing participants voiced concern about having to water a device with electrical components. Another thought was to use a simple light with the receiver technology built in, but without any particular form.

This would allow users to stick the device anywhere: in a real plant, in a fake plant, on the refrigerator, etc.

In addition to addressing the volunteer retention problems, utilizing such a system could also address funding problems. This device must find its way into the hands of users and there is no reason that the system could not be used to generate additional income for the garden. The device could be loaned or rented to the volunteers for a monthly fee, resulting in a steady income. Another option would be to place the device in retail stores. This would provide income, as well as increase awareness of community gardens in general. Unfortunately, this would require the cooperation of local retailers, which is unlikely without financial benefit for the retailers. The most feasible distribution method would be to provide the device as an incentive for volunteers to donate funds. Upon donating a set amount the volunteer would receive the plant as a memento of their generosity, giving it more value to both the volunteer and the community garden organizers.

Conclusion

Through the use of an ambient system in the form of a glowing plant, we intend to inform the members of the activity level in a garden. Members would hopefully be persuaded by this information to join other members in the garden, enhancing the community that already exists. Community begets community.

Benefits of an expanded and lively community include a larger and more bountiful garden. A strong community will prevent volunteers from becoming bored and tired with the garden. The hard work that dissuades some volunteers from returning is distributed among a larger number of people. The lack of care and attention that is plaguing many community gardens would be all but extinguished.

Additionally, these community gardens would help sustain the local economy. Tools, seeds, and gardening

supplies would all need to be purchased from local stores, as opposed to the large equipment required by commercial farms. Surplus produce would be given to local restaurants and community services, again reducing the need for external sources, and also saving money for the business to which the produce is being donated.

With more people working in and reaping the fruits of a community garden, there would be less demand for external produce sources. Community garden members would become less dependent on grocery stores for their vegetable consumption. This would allow the current crop of commercially produced vegetables to be consumed by others who are unable or unwilling to grow their own.

All of the above mentioned consequences can, and will, be the result of a stronger community enhanced by the use of a small, unobtrusive, glowing plant named JADE.

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