Group C13: Needs Identification and Problem Statement

GNG1103 - Engineering Design

Deliverable B - Needs Identification and Problem Statement

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Introduction

Growing Futures is an initiative that is currently led by a group of young entrepreneurs, aged 10 to 13, who are passionate about making an impact in the community. The idea behind the project is to deal with the issue with food scarcity, but with a different approach; instead of focusing on the lack of access to food, the aim is on poverty. This is achieved with the use of a 'Growing Wall', a 7 by 8 foot wall made of hydroponic towers to grow vegetables, whose produce are then sold at reasonable prices throughout the city. This project has been quite successful, as they have properly harvested several plants, such as kale, lettuce, and basil, all with excellent feedback from consumers about the high quality taste and freshness of the products. While the 1.5-year project has seen some success, there are key areas for improvement that would assist in making this project better. When meeting with entrepreneurs, a number of issues were brought up and presented for this team of engineering students to solve. After careful consideration, analysis, and discussion of their points, three key priorities, in order of importance, were concluded from the original presentation. This report will outline these priorities for the Growing Futures project, and they are as follows: portability, reservoir inadequacy, and branding.

Apparatus Portability

The first issue that was brought up by the children in their presentation was portability of their system. They mentioned that they are experiencing issues regarding transportation of the apparatus by hand. For instance, part of their duties is to bring the plants across multiple floors. However, the elevator is limited to a 7-foot height clearance, which is the same height of the elevator, indicating an issue in transportation. So with the idea of improving portability comes improving compactability, as it would be helpful for the apparatus to be able to fold into smaller dimensions to better fit in the elevator. In addition, carrying the components by hand is not practical for long trips, so another key idea is to have the ability for wheeling the apparatus from place to place. This would mean the incorporation of several possible changes. To begin, the size of the towers need to be much smaller, allowing for easy access to the elevator, and this would also assist the children in cultivating the plants at comfortable heights.

Reservoir Size

The second issue that is present with the current system involves the reservoir, located at the bottom of the unit, which supplies water that is pumped up to the plants. The major problem with the current model is that the size is too small, which forces the user to fill the tank with 10-15L of water per week. Furthermore, the reservoir cannot operate without supervision for extended periods of time, such during the breaks like the winter or spring breaks, which can cause the plants within the system to perish. Another issue with the current system is the inability to accurately measure the pH of the water and the discrete

measurements of water currently in the reservoir. Currently, the pH of the water is being tested using litmus strips, which is not the most precise while better methods of testing are available. The water level can only be currently viewed from the top, so it would be beneficial if it could be monitored by either viewing the tank, receiving a water level from an local display on the apparatus, through an alert via a smartphone application.

Project Branding

The third issue is related to their needs on having a place to present their brand on the system. Seeing as one of their goals is to expand their project towards larger impacts, it is essential to have a brand name presented on the system so that more people would know what their work is all about, and/or have a clear name to research if they want to find out more information. If people simply see the plants without knowing the reasoning behind it all, the mission would be incoherently demonstrated. Therefore, having a good brand name is essential for showing who they are and what they do. To accomplish this goal, they want their logo to be clearly visible for people to see it without any interference from the plants and the intricacies of the towers.

Conclusion

In summary, Growing Futures is a project that aims to end food scarcity in Ottawa while teaching young individuals responsibility through properly growing food and managing a business. While they have achieved a great number of feats in the 1.5 years of operation, there are some areas of improvement that need to be met for Growing Futures to reach their overall mission. Essentially, the requirement is design of a hydroponic growing system that is automated with the incorporation of a larger water reservoir, all while being portable and light enough for the students to transport manually. Furthermore, the project should incorporate a better branding in order for the project to have a direct impact upon viewers, allowing for greater exposure and to reach the impact level that is desired. After overcoming these challenges to improve the overall design, Growing Futures will be better equipped and prepared to be greater service to the community.