Education Kitchen: Incorporating healthy food into the lives of children*

Extended Abstract†

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ABSTRACT

This paper presents the design of an educational kit for children to learn about the growing process of the fruits and vegetables that end up on their meal plates. The kit, is primarily for teachers and parents to request and purchase to engage in activities with their students. The kit would include base items such as seeds, a guide to growing food, an activity book and additional printed materials with AR scanning features. The overall experience applies learning about food literacy and food security to real life scenarios. Children can learn about fresh food by deepenening their relationship with food and food sources no matter income level or resources (e.g. access to technology). The goals of this kit include: educating people across income levels about fresh produce as well as the importance of supporting local farmers and food gardens, addressing some of the challenges such as cultural barriers and technology barriers often not addressed by other interventions, and to create a solution that activates a generation of youth through schools and the home to be future fresh food advocates. Research helped identify existing products and competition, and user testing contributed to an expansion of the kit to incorporate real life examples.

CCS CONCEPTS

• **Human-centered computing** → **User centered design**; **Interface design prototyping**.

KEYWORDS

Education, Health literacy, food habits, children, AR

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1 INTRODUCTION

A study made by [8] in 2007-2008 showed that 1 in 6 US children and adolescents aged 2-19 years were obese. Childhood obesity often tracks to adulthood [11] and, in the short term, childhood obesity can lead to psychosocial problems and cardiovascular risk factors such as high blood pressure, high cholesterol, and abnormal glucose tolerance or diabetes [2]. Furthermore, studies have suggested that obesity is greater in the low income population than in higher income individuals [13].

Healthy People 2020 [5] emphasizes that efforts to change diet and weight should address individual behaviors and involve environments that support these behaviors such as schools, work sites, health care organization, and communities [5]. In fact, health status and related health behaviors are determined by influences at multiple levels: personal, organizational/institutional, environmental, and policy. Because significant and dynamic interrelationships exist among these levels, educational and community-based programs are most likely to succeed in improving health and wellness as they address influences at all levels and in a variety of environments [6].

Young children are particularly at risk for obesity because they are fully dependent on adults for their nutritional needs in both the home and child care environment. During early childhood, lifestyle behaviors that promote obesity are just being learned, and it is easier to establish new behaviors than to change existing ones [4]. Thus, this provides a unique opportunity to intervene by addressing a family and education environment that fosters healthy practices.

From non-profits to educational farms, there are many organizations out there whose sole purpose is promoting health literacy [9] [10] [12]. Some solutions have already embraced a technological approach and social media trends to appeal to the younger generation [3] [1] [7]. However, there seems to be a general lack of a direct connection to schools. Teachers connecting with students who then can bring knowledge home to parents could potentially be the most direct way to impact a local community and influence its future. In order to address this problem, we designed a solution to teach children about health benefits of fresh fruits and vegetables. Our solution, Education Kitchen, contains interactive and engaging activities to be performed at school and at home allowing children to incorporate healthy habits in their daily life. Furthermore, based on design precedents, we decided to include a novel approach by giving children Augmented Reality activities to enhance their experience with Education Kitchen.

2 RESEARCH AND REQUIREMENTS GATHERING

We conducted semi-structured interviews with 11 individuals between pediatricians, nutritionists, public health specialist, teachers, food activists and a chef. Some insights from our interviews were that design interventions must be created within the community and it is critical for the long-term viability of any solution. For example, starting a farmerâĂŹs market in a community without the support and trust of the people in the community will never take off or succeed. Additionally, interviewees emphasized that health literacy is a core issue to address and that a holistic approach and view is critical to change healthy habits, interventions in isolation are not effective.

During the course of our interviews, our focus shifted from looking specifically at low income population and food deserts to the more general and pressing matter of food and healthy literacy. People who donâĂŹt have access to fresh, healthy food can be resistant or wary to changes in their community that provide them access to it. On the other hand, people who do have access to fresh food are unconsciously or consciously choosing not to purchase it. There was also much discussion of the growing disconnect of how food gets from the farm to the table. Multiple interviewees also brought up the effects of unhealthy food advertising on all populations. Most agreed that technology and social media could play a larger role in promoting health literacy, and all agreed that kids should be the target audience for any promotions and awareness programs. As mentioned above, integration into the culture of the local community was emphasized as a key factor in the success of any initiative.

3 DESIGN PROCESS

Based on our interviews, we applied UCD techniques as empathy mapping, and Personas and Scenarios to gain deeper insight into our users. With a school teacher, an urban farmer and a 12 years old kid represented with these tools, we realized that the proposed solution did not require necessarily the use of technology, instead, it needed to be a cohesive solutions between the school and home environment, it should be approachable, simple and provide awareness of healthy food.

However, we analyzed then some design precedents using the rose, thorn, bud technique and we identified as a potential feature to include some novel activities to differentiate our solution form the market. Thus, we decided to add a technological bonus layer by providing interactive activities with Augmented Reality. It is important to highlight that the AR feature is an additional characteristic for the solution because our intended objective is to reach kids from different socio economic incomes and by giving alternatives to those who do not have access to the technology.

After establishing our requirements, we started off with sketches and a storyboard of our preliminary idea that included a box containing an activity book, seeds and a poster, as well as a prototype of the app for the AR functionality. The solution was presented in a class of Interactive Media graduate students and some valuable feedback received was making the workbook more kid-friendly (add more color, activities, use understandable language), add more information as nutrition facts and recipes, and someone suggested

Figure 1: Education Kitchen Kit

that the AR feature could be more than nutritious information, something really special, something with âĂIJunlockable itemsâĂİ.

4 EDUCATION KITCHEN

For teachers, public health specialists, and non-profit organizations whose mission is to educate and assist populations in learning about the health benefits of fresh fruits and vegetables, our Education Kitchen kit will provide them with an affordable intervention targeted at connecting with children through activities designed to spark conversations and interest in healthy food choices at home. Different from other health literacy apps or community gardens, Education Kitchen doesnâĂŹt require land resources or offer a one-size fits all information overload solution. Our kit is seasonal, and personalized per region or zone in an accessible âĂŤ analog and digital âĂŤ format designed to be inclusive rather than intrusive. It is designed to support those passionate about bringing health education to populations in a way that engages the change agents within a community: its children. Education Kitchen will, in the future, offer the opportunity to bring communities across the globe together as they learn about healthy foods creating a greater connection to how food is grown, to their plates and into their bodies. The kit will include the following materials (Figure1):

- Workbook: Contains various activities, such as coloring pages that explain the origins of a seed, the life cycle of a plant and nutritional facts. Interactive recipes are also included, the workbook comes with stickers that correspond to the different ingredients required for each recipe and children are in charge of âĂIJmixingâĂİ these ingredients on the page, while parents help them with the recipe in real-life.
- Gardening elements: A pot, soil and various types of seeds will complement gardening instructions from the workbook.
- AR-feature: Some pages from the workbook will have a character at the top that can be scanned through our AR mobile app and the kids will be able to see real-life informative videos. These videos represent âĂIJunlockable itemsâĂİ, that can only be activated by coloring the corresponding workbook pages completely before scanning.

In order to test with users, we created a sample of the workbook for one vegetable (Figure 2).

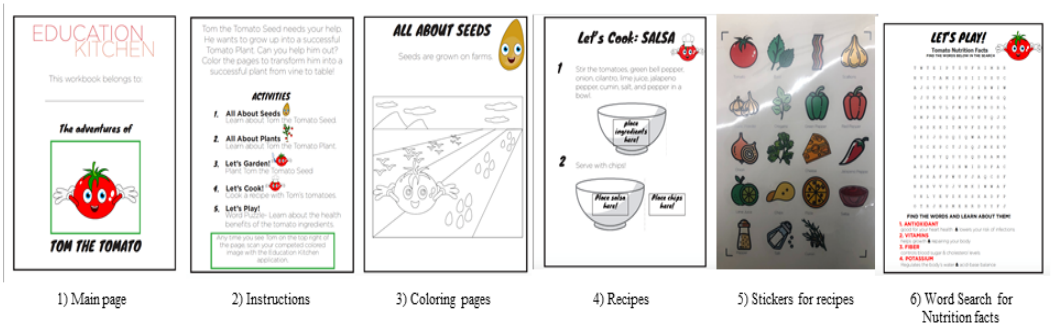

Figure 2: Detailed Education Kitchen Workbook

5 USER TESTING

For initial user testing, a five-year-old child and her parent used a prototype of the kit that involved coloring pages and recipes. The augmented reality component was discussed but not realized. There was general confusion about the AR component. The child was excited to see that one of the recipes was pizza, to the point of being distracted from the other workbook pages.

The second round of user testing involved the additional stakeholders of a kindergarten teacher and a nanny. This time we added a new interactive element to the recipe section where a child âĂIJfollows alongâĂİ with the real-life recipe by creating recipes with stickers of ingredients. The nanny was supportive of this addition and enjoyed the prospects of a child being able to interactive with the workbook without a needed augmented reality component. The teacher pointed out the lack of a nutrition page in the book, which is key in tying together healthy eating with fresh produce. This page was added in the form of a âĂIJLetâĂŹs Play!âĂİ page, which features a word search. During this round of user testing, AR focus was changed to incorporate informative videos that tie Tom the Tomato with real life scenarios.

6 DISCUSSION

Education Kitchen specifically highlights incorporating healthy food into the lives of children from a young age. The end goal is for children to maintain a healthy lifestyle, therefore decreasing their chances of obesity and other health problems in the future. By educating children about gardening in a fun and interactive way, they will enjoy learning about the foods that they should be eating while keeping themselves healthy.

Our challenge during the User Centered Design (UCD) process was designing to target our audience by keeping our product child-friendly. Another challenge we faced was keeping a high level of interactivity, even for the children without the AR technology. Storyboarding assisted us in exploring a range of ideas as our design solution evolved over time.

Our design proved to be useful during our usability testing with parents and children, but we believe that further changes can be made. Due to constraints in AR technology, we could not complete our user testing with scanning the pot, but userâĂŹs thought the videos were a great way to tie our product into how it works in reality. We got positive feedback about the workbook interactivity but there can be further improvement on the AR component. For the future, we will keep the object that will be scanned consistent throughout to avoid any confusion. Ultimately, Education Kitchen proved to be a success to get children and parents interested in healthy food.

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