
WALC: An Incentivized Walking System

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Abstract

The WALC (Walking Around the Local Community) system—an incentivized walking system based on local currency programs—reinforces community identification, economic strength, and encourages walking through use of portable progress tracking devices, an interactive city display, and community/business integration technologies. This community-level system is a unique collection of existing technology components and visual interaction linked by the personal carabiner device that will track the walking progress of the community participants.

Keywords

Walking, system, incentive, community, sustainability, interaction design

ACM Classification Keywords

H.5.2 User-centered design, D.4.7 Interactive systems

INTRODUCTION – THE PROBLEM

Encouraging people to walk is fraught with complex challenges—community and societal factors, deep-rooted behaviors, as well as the necessary expenditure of time. The challenge is to encourage people to take a walk, addressing the main theme of community and creating positive value to both the walker and the locale. The endeavor to encourage walking behavior change is one that could potentially be approached on a

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community-wide level; doing so can have direct benefits for the local community and walking individuals.

Walkability

The most readily available location for a person to walk is the area surrounding an individual's home or workplace. Studies have shown walkability of a particular location relies on a number of factors: environmental aesthetics, convenience of walking areas, accessibility of destinations, and perceptions associated with traffic and safety [20].

Time

Walking, as an activity for transportation or leisure, requires time. In the case of walking for transportation, people who have access to faster, alternate modes of transportation tend to select options associated with the highest energy conservation and convenience [17].

Behavior

A successful solution requires these factors be accounted for, while fundamentally encouraging people to walk as a long-term behavior change; people must feel walking is worth the extra steps.

EXPLORATION OF A SOLUTION

To learn more about how to address the issue of encouraging people to walk, early in the design process we conducted a series of short interviews with walkers, non-walkers, and small business owners, and phone interviews with a city councilor and a business owner.

Interviewees stated lack of time, undesirable weather conditions, and self-motivation were their primary reasons for not walking. Meanwhile, storeowners

emphasized the importance of foot traffic to sustain business.

Our results of this initial problem space exploration suggest that encouraging people to walk near community businesses may propagate the success of local businesses. However, in order to encourage local community exploration, an incentive must be provided to account for the time it takes to walk.

Community Walking Initiatives

A survey of existing successful walking initiatives yielded many examples of current community-wide walking programs [5, 10, 25], advocacy groups [3], health organizations [26], and government bodies [2, 7, 6, 13]. A community-level solution is a viable option.

Motivating Movements

Specifically changing walking behavior is not without hope; a mass communication agenda for motivated public behavior change has been a very effective way of altering perceived social norms and behavior in communities [1, 17]. Several organizations and cause promotions have successfully encouraged sustaining movements and behavior change. Utilizing the strategy of a successful cause campaign with a spokesperson or icon, a strong message, and community networking, walking to improve one's community can become a lasting initiative [18, 19, 28].

Local Currencies

People tend to choose behaviors that result in the most immediately applied benefits [22]. Because community businesses have a vested stake in increased walking in their community, a local currency could be leveraged as a community-based immediate benefit to a walker.

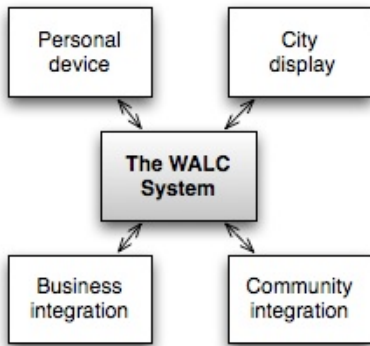


Figure 1. The four components of the WALC system consist of a personal device, city display, business integration, and community integration.



Figure 2. The personal carabiner device prototype is shown here, attached to a participant's bag during the WALC experience evaluation. Most participants chose to either attach the carabiner to a bag or a set of keys during the scenario activities.

There are many examples and research on established, successful local currencies [14, 20, 24]. Recent examples have shown high participation and effective results in improving local economies for business owners [15, 21, 9].

Loyalty Rewards

Providing people with rewards for desirable outcomes is a classic topic in psychology research [23], and the general concepts are applied in loyalty and “rewards” programs are becoming common in today’s consumer culture. Research has found that 37% of consumers would be interested in participating in a mobile customer loyalty program [11], and an increasingly large number of shoppers are signing up to receive applications such as Yowza [12, 27]. Yowza allows customers to check for nearby businesses on their phones to explore local deals in real-time. However, Yowza’s restrictive nature to only smart-phone users—a mere 11.8% of the American cell phone market [8]—demands for a more accessible model.

THE SOLUTION – THE WALC SYSTEM

Inspired by the theme of community, and guided by our primary and secondary research, we designed a solution that would demonstrate immediate community impact, change walking behaviors, and openly acknowledge and account for the required time it takes to walk.

Overview

There are four necessary segments to correctly implement the WALC incentive system: personal device, city display, business integration, and community integration (Figure 1).

The personal device will be the artifact walkers will carry with them when trying to earn credit—in the form of points—for walking in the participating community. These points are collected as the user navigates the city and passes sensors. These points are redeemable and point balances are viewable.

Personal Device and Control Interface

The artifact will take the physical appearance of a common carabiner (Figure 2), due to its portability, durability, and attractive aesthetic (an essential feature since we wanted to encourage users to display their device signaling their participation). An included tag on each carabiner can be customized by the city to be a consistent, identifiable message for the initiative.

For privacy, each carabiner will have a unique serial number and points earned will be tied to that number, not an individual. A control interface will allow a profile to be created for each carabiner in the event that it has been misplaced, stolen, or damaged.

The carabiner will leverage existing RFID technology, thereby reducing the cost of implementing this system. These technologies have been proven to be accurate and reliable, and are small enough to be incorporated into the carabiner without affecting its shape. The technology used in the personal device will be inexpensive to produce; the approximate total cost would be \$2.15 USD.

City Display

The display recognizes any individual walking up to it while carrying a registered carabiner, and provides the point balance and a randomized list of nearby participating businesses and offers. The city display



Figure 3. The proposed logo for the WALC system is a geometric turtle. One idea for branding a movement was to acknowledge walking as a time consuming activity, but rewarding, making reference to the classic tale of the *Tortoise and the Hare* of *Aesop's Fables*.

should be large enough for up to three people to use it and located where the implementing city defines the city center, near local businesses, and at a safe place for several people to pause or congregate.

The city display essentially merges existing LED display technology [16] with RFID technology to provide informative visual feedback to participating walkers. Falling costs of both technologies means, for example, procuring a 55-inch LED display and integrating an RFID reader would total approximately \$5400.00 USD.

Business Integration

Integration to participating small business locations makes use of common point-of-sale systems with RFID payment technologies for walkers to redeem points. Additionally, each business will be provided with secure access to an automated telephonic speech recognition system to submit discounts and offers to the city display, and branded signage to indicate participation in the WALC system (Figure 3). Telephonic and existing point of sale systems requires less service and administration than completely new technologies, thereby reducing initial implementation costs.

Community Integration

For the WALC system to be integrated into a community, receivers—compatible with RFID—must be integrated into the community for the purpose of tracking distance and movement required to earn walking points. The receivers should be small enough to blend into its surroundings, or highly visible with signage, per the implementing city's preference.

By employing components that cities and communities are already familiar with and have known success rates, the system should prove its lasting impact on the community, and lower barrier to implementation.

EVALUATING THE WALC EXPERIENCE

Method

To evaluate the experience of interacting with the proposed WALC system, we generated an experience evaluation scenario with three rapidly prototyped components of the WALC system: a personal carabiner, a city display, and a storefront checkout. Using this system prototype and a series of actions to execute in a given scenario, we gathered users' responses to each of the separate elements of WALC, noting potential areas of confusion. Audio and video was used to capture users' verbal reactions, body language, and expressions while interacting with the system. At the scenario conclusion, final impressions were collected using a modification of Microsoft's product reaction card method [4]. Identical evaluation studies were conducted at a West-coast university city and a Midwest university city with four participants per study.

Results and Analysis

The systematic modified product reaction card method allowed the team to use a standard set of adjectives across all participants. Each participant selected three words on the available list that described their experience. The most prevalent descriptions were: fun, easy to use, and accessible. These were followed in popularity by: simplistic, confusing, motivating, organized, and straightforward.



Figure 3. An early rough sketch of a fictional user interacting with a reflective city display that will show a carabiner, the current points balance and some randomized nearby business where those points can be redeemed.

Most participants had no trouble understanding the system and successfully identified all components of the system and also properly interpreted visual content on the city display. All the participants found the carabiner artifact aesthetically pleasing and claimed they would not mind showing it off to others to promote the program. One participant stated, "It gives value for something most people do not normally think about." Meanwhile, another commented that while the system was simple, having a busy lifestyle would still impede him from taking time out to explore local participating businesses. But if forced to walk, having points would decrease his level of annoyance.

DISCUSSION

Potential System Abuse

Abuses such as driving with a carabiner device, repeatedly passing a single sensor, or theft have been addressed by this design. The point calculation software would not collect points while a device moves faster than approximately five miles per hour or passed by a given sensor twice sequentially. Theft is addressed by the use of the control interface where each carabiner is registered. This interface allows users to deactivate a given device.

Potential cheats of wearing two devices and pets with devices has not yet been assessed and solved, but should be solved before full-scale implementation. The design should not programmatically prevent proximity of devices so that walkers may travel together while earning points. Pet owners who use the carabiner while walking pets should also not be excluded if the device is clipped to a leash.

Future Enhancements

In addition to the modification of certain incentives to reduce possible abuse of the system, we would like to explore advanced city display concepts to stimulate user engagement, expand the dissemination of the program, and propagate the system as a causal movement. Additionally, while development of an online interface or mobile application may discourage people from visiting a city display to learn about their point balance and offers, the design may include this feature for user convenience.

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