

## Project Proposal - HCI (INFO 6410)

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### PROBLEM/IDEA

Physical inactivity, common in 1 out of 4 adults, has been identified as the fourth leading risk factor for global mortality. It leads to higher risk for heart disease, stroke, type 2 diabetes, and causes an average of 3.2M deaths annually. Factors that contribute to this issue include:

- Ubiquitous media devices and platforms that don't require movement
- A lack of parks, sidewalks and sports/recreation facilities
- Quicker and less physically intensive options to commute (Uber, subway)



We propose that by adding physically-interactive storytelling, we can make digital technology the solution, rather than the problem.

### ANALYSIS

Physical inactivity is one of the the most serious problems that has emerged as a result of the conveniences offered in the modern world. Everything from groceries to entertainment is available with the click of a single button. For example, most modern white-collar jobs are sedentary desk jobs. Even in the little free time that people have, they are constantly tempted to sit around and play video games, or read articles on the internet. As convenient as it may be, all these activities encourage a sedentary lifestyle which places people at a higher risk for back problems, posture issues, heart diseases, and diabetes. More than 80% of world adolescent population is insufficiently physically active.

Though often the scapegoat, connected digital platforms/devices cannot be blamed, as it is the applications created for them that define their utility. They have enabled people to access a huge amount of information in an effective way and have been a primary factor in driving innovation. Their ubiquity makes them the ideal interface for engaging users with the winning combination of an immersive experience and physical movement. For example, the Wii fit and Microsoft Kinect have had considerable success in combining the two. This success in the gamification of exercise leads us to believe there is potential in an immersive storytelling environment that encourages people to get up and about.

Doctors prescribe that any physical activity (even one as simple as walking) can be a very effective counter to obesity. If a platform could encourage users to move around the house/workplace and perform activities like walking, crouching, and stretching, it would be a step in the right direction. Our intention is to redefine the usage of these devices in a favorable manner.



### SUGGESTED SOLUTION

The hypothesis is that by engaging a user with an interactive story, the user will be more willing to participate in voluntary physical activity.

The proposed solution is to create an Augmented Reality (AR)-based story platform that will engage the user with a story, while simultaneously requiring the user to actively explore the physical world in order to progress the story forward.

While the ideal platform for such an application would be hands-free, until such platforms are available, the most suitable device would be an iPad (or an Android tablet). Users already engage in stories and games with this platform, and it offers a large screen in order to easily view virtual content overlayed onto the physical world. In addition to this, AR is becoming more widely available on this platform, and because more applications incorporate it, AR-use is becoming more commonplace.

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The application would offer a variety of stories that the user could select, and each story would be set in the physical world. A guide, i.e. the protagonist of the story, would lead the user through the physical space, and at key points in the story, would require the user to engage in physical activity, such as walking,



moving objects, or searching around a space, all the while tracking the movement of the user, and only progressing the story forward when certain activities have been completed. Each of these actions would fit with the flow of the story, allowing the user to feel as if he is part of the story. Through the lens of the device, the user would be able to see the characters interacting in the physical world, along with elements of the character's world mapped onto the physical world.

## EXPERIMENT

We propose conducting two separate experiments (using three user groups). The first experiment aims to confirm whether our solution would be feasible (can physical activity increase the perceived “engagement” in a story/game?). The second experiment aims to confirm whether it will be effective (can an added AR story/game layer make users more willing to engage physically?). For both experiments, the type of participants we would be looking for are young adults who self identify as being “inactive.” The general method for the experiments is as follows:

1. Participants split into three groups: AR-only, activity-only, and AR-and-activity.
2. After activity, participants complete survey to gauge: story (takeaways, detail retention) or activity engagement (estimated length, fatigue level, desire to keep going).



**Experiment 1** compares the AR-only group with the AR-and-activity group. Participants in the AR-only group will be asked to engage in the AR story without added activity requirements (e.g. just listen to the story), while participants in the story-and-activity group will test the prototype with treadmill-based activity requirements. Following this, participants will complete the story engagement survey/interview.

**Experiment 2** compares the activity-only group with the AR-and-activity group. In this case, participants in the activity-only group will be asked to walk on a treadmill for a set distance (corresponding to the AR activity), while participants in the AR-and-activity group will test the prototype with activity requirements. Following this, participants will complete the activity engagement survey/interview.

The independent variables are: the activity requirement (experiment 1) and the AR story (experiment 2). The dependent variable in both cases is the engagement test score. In both cases, the expected and preferred outcome would be a higher score. In experiment 1, the higher score corresponds to a higher content retention rate (and engagement) when physical activity is added. In experiment 2, the higher score corresponds with less mental strain associated with physical activity (and a willingness to engage in activity). In both cases, the negative result would be a non-significant difference in test score which would suggest that the AR technology would: not be feasible, as people would prefer staying static (experiment 1), and would not improve the willingness to conduct physical activity and therefore not solve the proposed problem (experiment 2).



## GROUP CONTRIBUTION

Collectively as a team, we identified the specific problem area, hashed out the specifics of the solution, researched the problem, and designed the experiments. The initial drafts for each section were distributed as follows: Problem/Idea/Analysis - Rohit & Alap, Suggested Solution - Brandon, Experiment - Jonathan. Each member of the team worked to provide edits and revisions for the final document.