

# Position Paper for CHI 2019 Workshop on Designing for Outdoor Play

Mobile Games That Promote Outdoor Physical Activity for Children

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## ABSTRACT

The following is a position paper for the Designing for Outdoor Play workshop for CHI 2019, reviewing the work, design contributions and theoretical position of the author at the intersection of games and outdoor play. In short, it provides a description of the author's recent design work as it relates to outdoor play, while also outlining their relevance to and interest in the workshop at CHI 2019.

## KEYWORDS

Play; outdoors; children; activity; mobile; technology; MVPA

## PLAYGROUNDS: FROM PAST TO PRESENT

Over the last 100 years, one might say that playgrounds have not changed a whole lot. Despite any changes in materials, surfacing, colors and even safety considerations in prescribing safer parameters for equipment, at the end of the day, swings are still swings and slides are still slides. But what has changed a whole lot over the last 100 years are children themselves.

Year after year, annual national surveys report a general decline in physical activity amongst children and a corresponding increase in screen time. Taking a recent national children's activity survey as an example, only somewhere in the neighbourhood of 14% of 5-11 year olds are getting the recommended amount of moderate-to-vigorous physical activity (MVPA) per day [1]. Moreover, there is also evidence that children are increasingly engaged in screen time and that high levels of time spent engaged in screen-based activities are associated with obesity [2].

Touchscreens are frequently blamed for these types of stats, and at a high level, children's attentional economies in this digital age do seem heavily inflected upon by the ubiquity of screen-based devices [3]. In fact, ParticipACTION's 2016 annual physical activity report

card for children and youth reports that 76% of 5- to 11-year-olds are getting more than the recommended limit of 2 hours of screen time a day [1]. Even more telling might be the self-reports of children who claim as much as 7 hours and 48 minutes of screen time per day [4].

Given the commonplace nature of screen-based devices in our culture and the increased screen time trend in our children, this invites the question, 'how can we use technology-based tools to engage children in MVPA?' In the wake of 'active' video game technologies such as **Nintendo's Wii** and the remarkably successful **Pokemon Go**, we endeavoured to employ the motivating effect of screen-based devices to achieve the objective of increasing the outdoor activity level of children who use them, and we did so by deploying a suite of mobile games designed to get kids off the couch and participating in greater amounts of MVPA on the playground [5]. These games leverage the use of imagination by presenting fictional scenarios that prompt instances of active play on the playground, upheld by the phone in unique ways. We call this system, 'Biba'.

## WHAT IS BIBA?

Intended to be played by parents and children together on mobile devices, Biba is a collection of games for iOS and Android that expressly seeks to reorient the screen-literacy of today's child towards active, physical play for boys and girls aged 3-9 years.

A Biba game takes place on the playground and involves a parent holding their phone with a game open and issuing playful directives that the child is to follow based on the imaginary premise presented (i.e. you're a treasure hunter, you're a race car driver etc.). The child spends most of their session time playing away from the phone on playground equipment based on the game directives. The child returns to the phone intermittently to perform a game function, completes a mini-game or advances their progress through the game's imaginary

scenario such that the device is performing a contextually supportive role. For example, if a child is in a car in ‘Biba Drive!’, they are completing laps and stopping for repairs at their parents phone to perform a ‘pit stop’ which may ask them to blow into the phone to extinguish an overheated engine. While one can think of it as ‘Simon Says meets Warioware’, the aim is to intrinsically motivate children through imagination and challenge-based experiences that are accentuated by the screen, rather than driven by it. In other words, kids play Biba through the phone, rather than on it.



**Figure 1: Playing a baseball themed Biba game on the iPad. Biba iPad games can handle up to 10 concurrent players.**

In addressing MVPA, what is perhaps Biba’s most fundamental principle is encouraging kids to use their bodies to enact or participate in Biba games and not simply sit on a bench and passively move their progress forward through an avatar. Children effectively take on the role of the avatar with parents getting actively involved using the readily accessible digital device they already carry with them. This built-in parental engagement is intentional, not only for child and device safety, but in the promotion of children’s MVPA itself [6]



**Figure 2: During a Pit Stop in Biba Drive, the phone ‘pours energy fuel into’ the arm of the player.**

Biba seeks to advance a child’s investment in gameplay by offering role-play experiences that are easy to apprehend. Games serve to turn playgrounds into ‘Landscapes of Imagination’ with a call to action that

incites a child to take intuitive, contextually relevant actions on the playground.

So, for example, if a Biba game situates a player as a spy in ‘Biba Secret Agent!’, kids need to hurtle down slides, escaping from the fortified strongholds of evil syndicates. If a child is a car in ‘Biba Drive!’, they’re completing laps and stopping for repairs at a Pit Stop. If a child is a Treasure Hunter in the eponymous Biba game, they’re squeezing through passages (tubes) and climbing up inclines (climbers) leading into ancient chambers. It’s all about fun, role-play and imagination.

In short, the call to action that fundamentally underpins a Biba game can be summed up as:

**‘If I Am A \_\_\_\_\_, This Is What I Do!’**

...and this is what the mobile device enables as a supportive and reinforcing tool for outdoor imaginative play. Biba is all about kids performing physical activity in as intuitive fashion that is native and natural to a given game scenario.

At the end of the day, it is our mission *to re-orient a child’s screen-habits to the outdoors*. We believe that mobile game play should be as intuitive a component of a child’s outdoor physical play as it is sitting at home, playing a standard video game. Furthermore, as we’ve incorporated augmented reality (AR) into our designs, we’ve steadily realized that playgrounds and outdoor green spaces may be among the best-case deployment scenarios for AR in general, introducing even more novel and captivating ways for outdoor games to bring fictional spaces and well-loved characters to life for children. In the same manner that we as children once pretended to bring our favorite fantasies, to life on the playground, today’s child can take this imagination-driven immersion to the next level through outdoor play enhanced by AR technologies.

## DESIGN RATIONALE AND JUSTIFICATION

Of course, there is the question as to whether Biba games effectively promote more MVPA in children than standard playground play. Given that promoting MVPA was our objective, we wanted to answer this as well, which is why we worked alongside child psychology faculty at Simon Fraser University in deploying a pilot sample within-subject research design in 2016. We used wrist-based heart rate monitors to measure the activity of

children who played both Biba with their caregiver (or equivalent) and partook in 'free play' on the playground. Average heart rate was calculated for each participant of both the free play and Biba play sessions and used to calculate a percentage change from resting heart rate for both sessions for each participant. A paired samples t test showed that the difference in heart rate was significantly higher in the Biba play session than in the free play session  $t(19) = 2.37, p < 0.05, d = 0.53$ . This was a more than 40% increase in heart rate for the Biba condition over standard playground play. These findings can be found in published in the **Journal of Child Health Care** [7].

We are also currently mid-stride on embedded trials with families who are providing narratives about their experiences with Biba games on the playground. Early feedback indicates evidence of increased playground retention and an increase in child-motivated visits to the playground as well.

The latest 2018 research from the National Recreation and Parks Association shows us that 70% of Americans believe that merging technology and the outdoors will increase the likelihood of children going to the park or playground [8]. In fact, Millennials and parents are particularly strong believers that merging technology with the outdoors will result in more kids wanting to go to the park. As such, with 3,600 Biba playgrounds installed in over 1,000 cities worldwide, we feel we are hitting the right window for a mobile screen-based intervention that today's young families will not only be prepared for, but will soon be actively seeking out for themselves.

## THE AUTHOR AND THIS WORKSHOP

Over the last 15 years, the author has worked in the serious games space for children. With previous work in educational web games for schools and research into alternative forms of tactile and auditory interaction with games and tablets, the author has spent the last 4-5 years looking specifically at design around mobile outdoor play that leverages accessible technology for families.

Along the way, the author has had the privilege of designing and researching in the outdoor play space alongside partners such as **PBS Kids**, **Sony Pictures Animation**, the **RAND Corporation** and others, giving talks on the subject of mobile outdoor play for kids at venues ranging from the **Game Developers Conference** to **Sandbox Summit** to the **U.S. Play Coalition Conference**.

It is the author's strong desire to see games of the outdoor play variety reach parity with your average sit-down screen-based experiences for kids--which is why it is of genuine interest to engage with others who are also looking to take on the challenges of this space: challenges of technology, of attention, of market penetration and of cultural and systemic sedentariness. To date, games have focused far too much on keeping users in their seats. This author believes that the next frontier of game design is in creating experiences that can get people out of those seats and back out into the real world.

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