Co-Engagement with the Natural World through an Interactive Mobile Application

Saba Kawas
Information School
University of Washington
Seattle, WA 98195, USA
skawas@uw.edu

Katie Davis
Information School
University of Washington
Seattle, WA 98195, USA
kdavis78@uw.edu

Sarah K. Chase
School of Environmental and Forest Sciences
University of Washington
Seattle, WA 98195, USA
schase25@uw.edu

Joshua J. Lawler
School of Environmental and Forest Sciences
University of Washington
Seattle, WA 98195, USA
jjlawler@uw.edu

Abstract
As part of our research, we are studying the potential for interactive technologies to create opportunities for children to connect with nature. We developed a beta version of a mobile application, NatureCollections, that was co-designed with KidsTeam UW, that aims to engage young children (ages 7-12) in an exploration of the natural world. The app allows children to build, curate and share photo collections through individual challenges and simple photo classification walkthroughs. The app will also seek to facilitate collaborative play through team scavenger hunts and photo challenges. We piloted an app evaluation with 8 children in a botanic garden. Initial qualitative observations suggest promising results for the effectiveness of NatureCollections to draw children's attention to their natural surroundings and spark playful social interactions. In the upcoming months, we plan to qualitatively and quantitatively assess the app's ability to motivate children to spend more time outside. Later, we plan to deploy the app to evaluate its effect in increased connectedness to nature in situ. We believe the Workshop on Playing Together: the importance of joint engagement in the design of technology for children will be an excellent venue to discuss our design work and pilot results. We are also excited to learn from other real world case studies presented at the workshop on how we could focus our app interactions on co-engaging children with the natural context around them.

Author Keywords
Interaction Design and Children; Collaborative Play; Nature Nomadic Inquiry; Scaffolding; Learner-Centered Design; Nature Connectedness.

ACM Classification Keywords
H.5.m. Information interfaces and presentation for the full list of ACM classifiers.

Introduction

The NatureCollections app aims to support children's outdoor activities, and, at the same time, address a major challenge to conservation efforts – concern for nature. Reducing habitat loss, a major driver for biodiversity loss, depends on the effectiveness of laws and policies, but perhaps more importantly, stemming habitat loss depends on people's actions and attitudes towards nature [7]. Given the link between time spent in nature and environmental attitudes, the fact that children are spending less time outdoors than ever before poses a threat to the future of nature conservation [3]. Our research seeks to understand the potential for a mobile application to increase children's opportunities for playful exploration of the natural world, and to promote positive relationships with nature. Active, free outdoor play contributes important benefits for children's cognitive, physical, and social development and their overall emotional well-being [2,6].

Research Design

Although a number of mobile applications and games have been developed to encourage increased interaction with nature, to our knowledge, none has been tested to determine whether it actually affects children's environmental attitudes or increases their engagement with the natural world. There also has been less focus on free outdoor play as a pathway to increased connectedness to nature, as most play activities are structured around increasing children's physical activities [2,5]. In our research, we explore playful explorations though an interactive mobile application that encourages social interactions among children and their parents and teachers. We hypothesize that such interactions will increase children's engagement with the natural world. We ask: Can NatureCollections mobile app get children outside? Can this app positively affect a child's connection to nature? How can an interactive mobile application encourage children to co-engage in playful nature explorations? And how it can facilitate social interactions around environmental learning? Finally, how can an interactive mobile application lower the barriers for parents and teachers to set up outdoor activities to engage children with nature?

We approached these research questions using both cooperative inquiry with children and human-centered design methods [1]. We've also drawn on work from the fields of early childhood education and developmental psychology to explore how to best support children in playful explorations.

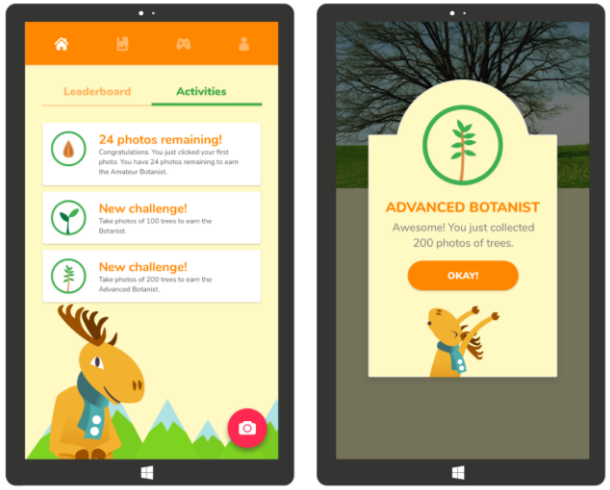

Figure 1. NatureCollections challenges screen & badges award

We used qualitative and design methods to inform the app design. We ran three design sessions with

Figure 2. Children collaboratively collecting nature photos using the NatureCollections app

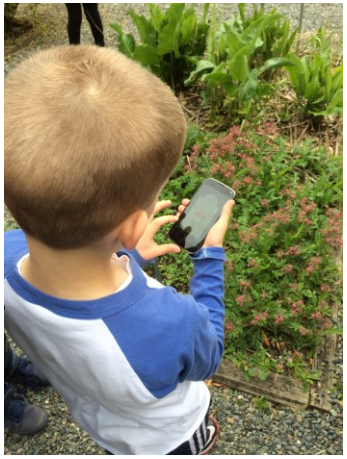

Figure 3. A child using the NatureCollections app to classify a shrub photo

the University of Washington KidsTeam, a design team composed of 7 children (ages 7-11) and 7 adult co-designers, to design the NatureCollections app features. Additionally, we conducted focus groups with parents and interviewed elementary school teachers about their thoughts and perspectives on the NatureCollections app feature ideas, as well as children's current technology use. Through this process, we arrived at the app design prototype, which allows children to build, curate, and share photo collections through individual photo challenges and simple photo classifications walkthroughs (See Figure 1). The app also facilitates collaborative play through team scavenger hunts and photo challenges.

We hope that by designing a mobile application, we will support children's engagement with the natural world and positively influence their attitudes towards the environment. In turn, we hope to increase children's opportunities for active, unrestricted outdoor play that come with collaborative explorations of nature.

Pilot Evaluation Results

We developed a beta version of the app that we pilot tested with 8 children at one of the University of Washington outdoor gardens. We handed each child a mobile device that had the NatureCollections app installed. We then allowed them to explore a botanic garden for 45 minutes, with no prompts or specific tasks. We observed children using the app in a natural context. Our preliminary qualitative results indicate the effectiveness of the app features to engage children with playful interactions both within the app and in their physical natural surroundings. The app also encouraged social interactions with other children. Children desired to view and interact with other's children's app content (like and share) as well as collaboratively classify photos of nature as a group, of photos they've taken separately on their devices (See Figures 2 & 3). Children also engaged with adult researchers in discussions around accurate nature classifications and identifying common species names. Some children even used google searches for additional information about the plant classification options. All children experimented with taking photos of nature; for instance, some explored artistic angles, while others tried to capture movement or zoomed in on details of leaves, petals, or insects.

Current and Future Work

We are currently in the second phase of app development. In the upcoming months, we will evaluate the NatureCollections app with teachers, children, and their parents, using a mixed methods approach. Once phase 2 is finalized, we plan to deploy the app in situ to assess its ability to get children outside and engaged with the natural world. Following an experimental design, we will recruit 60 children (ages 7-12 years) from a broad range of sociodemographic backgrounds and supply them with mobile devices over a two-week period. Thirty students will receive mobile devices with the NatureCollections app installed, and 30 students will act as a control group, receiving the mobile devices with no app. Using pre- and post-intervention interviews with children, their parents, and teachers, we will assess the app's effectiveness in engaging children with nature. We will also implement within-app assessments that will measure children's connectedness to nature using the Connectedness to Nature Scale (CNS) or the Environmental Connectivity scale instrument [4,8].

Conclusion and Workshop Participation

We would appreciate the opportunity to participate in the Workshop on the importance of joint engagement in the design of technology for children titled "Playing Together" for its relevance to our NatureCollections app design focus. We hope to provide experiences for children that support playful co-engagement with the natural world and collaborative social interactions. We are excited to share our app design approaches and pilot study results with other workshop attendees. We believe we would benefit from the discussions around theoretical approaches that other researchers and designers have relied on to guide technological innovations that foster co-play and joint engagement experiences for children.

Acknowledgements

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