

Exergames and Nature

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Abstract

Exergaming provides the opportunity to have fun while exercising, with accompanying technology guiding and enhancing the experience. Exergames often contain some elements of nature and outdoor activities, though it is not well understood how engaging and effective these elements are to users. This paper presents an exploratory self-study of experiences with three exergames that include or encourage outdoor activity: Walkr, Zombies Run!, and Pokémon GO. The paper outlines the experiences of the participants, summarizing common and different elements of their interactions with the exergames. It provides in-depth examination of select elements of the game play as they relate to engagement with nature. Finally, it provides insights on ways that exergames' elements have promise to engage users with nature.

Keywords

Exergaming, Connectedness to Nature, Outdoor Activities, Mobile Exergames

1. Introduction

Technological innovations have led to negative lifestyle changes, with people spending a great many hours in front of screens and away from nature [2, 3]. However, technology can also help us connect with nature and the outdoors through *exergames*, which we adopt the definition of *any video game requiring users to be physically active or perform some kind of physical activity in order to play* [4, 24]. Exergames have been emerging as an effective and entertaining way to motivate users to do more exercise or promote active physical activity [5, 24]. The HCI community has started to give attention to the subjects of health, physical activity, and well-being [8, 19, 20, 21]. Many exergames try to encourage users to go outside through references to outdoor places, activities, and environments [1, 25]. Free exploration of the outdoors during using some kinds of exergames provides opportunities for outdoor activities, spending time engaged in outdoors, including interactions with nature. Previous studies highlight the positive effects of physical activity and contact with nature to health and quality of life [6, 7].

Exergaming is the act of playing exergames that enhance physical movement and activity [5]. Exergaming generally uses technology that tracks body movement or reaction, such as exergaming with mobile devices that have the ability to track the users' real-world location as an input into the game [9, 10]. Such exergames seek to encourage players to explore the real world to interact with the game [10]. This paper focuses on three such exergames. Pokémon Go is a location-based augmented reality mobile game in which players need to walk and explore their physical surroundings to catch virtual Pokémon characters [11]. 'Zombies, Run!' is an immersive running mobile game in which players run from brain-hungry and bloody zombies through a series of missions, where players listening to the audio narration of stories can uncover mysteries while running [16]. Walkr: Fitness Space Adventure game [17] counts players' steps to help players earn fuel to explore the universe and move forward in the gameplay.

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This paper explores how exergames encourage people to engage more with nature--how using exergames help people spend more time in nature and ideally connect them to nature. To explore this phenomenon, the authors engaged in a diary study and roundtable discussion focused on three mobile exergames: Walkr, Zombies, Run!, and Pokémon Go. For the diary study, we noted usage details over the course of at least one week, then we engaged in a roundtable discussion focused on how the experience affected engagement with nature. We discuss the results to better understand the role of mobile exergaming in enabling the outdoor experience and how design features and elements help engage users in positive ways with nature.

2. Method and Analysis

We adopted a diary study approach to explore study participants' experiences and elicit the factors afforded by mobile exergames like Walkr, Zombies Run!, and Pokémon Go to enable or enhance participants' outdoor experience, encourage them to go outside, and how they interact with nature through the exergames' elements. This effort stems from a diary study assignment and post-activity reflective activity for students enrolled in an undergraduate HCI course in which students were asked to use the selected app for a period of at least one week (7 days), for a minimum of 20 minutes per play session, and to provide daily self-evaluation reports using either the in-situ logging or snippet technique [12]. Students could choose from a wide variety of apps, games, and sites, but the first author invited those students who chose to use exergames to be part of a deeper investigation focused on their engagement with nature while using the exergames. Five students volunteered and took part in a brainstorming and writing session: two who used Zombies, Run!, two participants who used Pokémon Go, and one participant who used Walkr. Participants ranged in age from 18 to 23 years old. This session allowed us to reflect upon and share with peers and the members of the research team some details about their experiences, both with respect to the mobile exergame and with the diary study, and thoughts on if and how the game supported or motivated participants to go outside, connect with nature, and engage them in outdoors.

We recorded the brainstorming session and used a question guide to facilitate the sessions and help us understand how participants think about mobile exergames and connecting with nature, and their motivations to choose the selected app (e.g., "Why did you choose this app?", "What does connecting with nature mean to you?"). Further, we asked in-depth questions to elicit the factors to enhance their outdoor experience and engage them in outdoors afforded through the selected apps. (e.g., "How did the application encourage you to engage more with the outdoors?", "Did the application distract you from the outdoor experience?", "Which game elements were helpful regarding connecting you with nature?").

We transcribed the participants' responses from the video recording of the brainstorming session. We analyzed this transcription using thematic analysis, which is widely used for analysing, identifying, and describing the themes found within transcriptions [13, 14]. The themes capture the main elements that our participants thought were helpful in understanding how exergames may be designed to encourage people to engage more with the outdoors.

3. Findings

To better understand how exergames encourage people to connect with nature, we identified key insights from the roundtable discussion for each exergame in the following three subsections.

3.1. Pokémon Go

Pokémon Go is a location-based augmented reality mobile game which is free to play. This application uses mobile devices with GPS to capture, train, battle, and locate virtual characters, called Pokémon, which appear on the screen as if they seem to exist in the player's real location [15]. Players need to explore areas and move around the places to capture the Pokémon. Accordingly, participants

agreed that the game gave them a reason to go outside, explore different places, and have more fun. They also noted that connecting with their friends to participate in a raid battle motivated them more to go outside.

“I figured it'd be nice to go in and go outside, get more active and stuff like that.” “I did connect with some others. My roommates actually play the game fairly regularly. And, so we would go out and play Pokémon Go, raid battles, where you can work together with people. And, it motivated me more to go out and do that.”

Even though the app made the users go to different locations, it did not necessarily help them connect or interact more with nature. They asserted that they went to a place to get the prize in the app and then left the location, because the game did not motivate them to stay and spend time in nature. They had interactions through the app and not with nature directly. In addition, participants noted that they felt like playing a game outside rather than being outside with the game.

“So if your cell phone is in the same coordinate area as a PokéStop, you're going to spend the focus that we get items. However, like if I'm going to PokéStop, I'm not going to enjoy the scenery or nature. I'm going there to get more items that make it harder to interact with nature and surroundings. I'm just there to play the game. I'm not there to enjoy nature.”

Indeed, participants mentioned that Pokémon Go distracted them from nature as they were required to actively look at their phones for an extended period of time to engage with the game, sometimes through fast, precise movements--though some parts of the game did not require close attention, so players could enjoy nature.

“There are some parts of the game where you can just kind of put it off and it'll do stuff in the background. And you can enjoy nature, you can let it not distract you that way. But there are a lot of aspects to it, like the act of actually clicking on a Pokémon and catching it or spinning one of the like PokéStops that are based on location that require you to actively look at your phone for an extended period of time.”

3.2. Zombies, Run!

‘Zombies, Run!’ is an ultra-immersed mobile exergame, in which players act as the character, called ‘Runner 5’ through the story’s missions while they run. Players can uncover mysteries through various audio narrations, collect supplies, rescue survivors, and defend the town from zombies [16]. Regarding helping users go outside, participants acknowledged that the app was successful. Due to the pandemic, participants used the app to push them to go outside and explore areas near them. In addition, interesting stories and the audio adventure aspect of the game made participants go for longer runs to see what would happen next in the stories.

“I think the ‘Zombies, Run!’ definitely got me outside more than I would normally. Especially like there were a few days, I remember I was pretty cold out, we normally wouldn't want to go out. And I went out anyway.” “These stories helped me run longer because I was just interested in what's going to happen next? And that made me run. So maybe I decided like I'm going to only run for half an hour. But some of the stories I was just so curious about that pushed me to run, so it ended up for an hour or so.”

Furthermore, each mission in the game begins with a story clip and an audio narration. Players can also listen to their own music from an external playlist, or enjoy nature sounds while they are running, but a computerized voice occasionally interrupts the tracks to tell the players to collect certain useful items, warn them about zombies, etc. Accordingly, since the app’s narrative was silent for the majority of time the players were on the app, participants mentioned that they connected with nature more than they normally did. They also pointed out that when users are on the base tab of the app, they can build up their base by gathering supplies, materials, building new buildings, and upgrading existing ones.

Therefore, participants could go ‘supply runs’ instead of going along with the storyline. Participants did not distract from the outdoor experience due to a good amount of silence in these episodes. They could observe nature and enjoy the outdoors while it promotes engagement with nature indirectly.

“The stories’ audio are usually five or 10 seconds, but the rest of the time, so the majority of the time that I’m on the app, it’s pretty silent, so I’m really just spending time looking around me and like I do. I am definitely connecting with nature more than I would normally say. It was successful in that.”

“The stories are not continuously playing. I would say like in small clips. So, in some of the episodes, I remember there was a good amount of silence. And during that time, we can listen to background music or we could just like not listen to anything and just look around and observe nature.”, *“In ‘Supply runs’, you just run and there’s no story, and it’ll just tell you to pick up a new supply. So, in that case, when I really didn’t want to hear the story and I just kinda wanted to go on a run and like the outside with nature. It’s especially good at having me connect with nature because I’m not really into the app at all”*

“I don’t think there are any aspects of Zombies Run that were directly very engaging in nature. Like it doesn’t tell you to stop and look around. But, I’m thinking that when I mentioned the ‘supply runs’, So when it’s a little bit less hands-on interactive, I am naturally just more interested in nature. So, I guess, it promotes engagement with nature.”

3.3. Walkr

Walkr is a location-based exergame that counts how many steps a person takes and converts them into energy. The energy can be used to speed up processes such as exploration, upgrades, and planet developments. This galaxy adventure game aims to encourage people to walk more while exploring the limitless universe [17]. Since the purpose of this app is motivating to go walking, the participant asserted that he could not do too much of that indoors or walking in circles in a room. Therefore, the app encouraged the participant to go outside; however, it did not matter where he was going, so the game did not provide an opportunity for him to interact with nature. The Walkr app also does not contain any elements regarding motivating people to interact with the environment. In addition, the participant noted that interacting with the app is necessary to read instructions and spend energy. Accordingly, the app could distract from nature rather than encourage engagement.

“There’s the capacity of how much energy you can have. So if you want to spend it, and the reason they have that is so you do spend it. So, it’s not like you’re wasting your energy, but in order to spend, yeah, it can distract you from nature because you have to use your phone.”

“It just keeps track of your walking data. Then transforms that until like a fun little game. It doesn’t necessarily help in terms of nature. It motivates you to go walking, but not really go outside or interact with nature. There’s no elements in it.”

4. Discussion

In this section, we identify the most important and promising considerations for exergame design that encourages people to engage more with the outdoors and interact with nature.

Encourage Outdoor Enthusiasm. All the participants agreed that each of the applications (Walkr, Zombies Run!, and Pokémon Go) motivated them to go outside and spend time in the outdoors. Two of the apps, Walkr and Zombies Run!, gave users the freedom to choose any geographic location or path. Pokémon Go, on the other hand, was a location-based game for which players were required to choose from locations that support game mechanics and intended method of play. For instance, Pokémon Go encouraged people to move to different geographic locations in order to find ‘PokéStops’ and catch pokémon creatures, gyms, etc [25]. This app’s feature supported players who enjoyed exploring, but PokéStops are more common in industrial, recreational, and tourist areas, as well as universities and are far more rare in rural and more natural areas [18]. In other words, the more

populated and urban areas seem more likely to feature PokéStops. In addition, locations must be named in the game, so only major landmarks are featured (e.g., Keffer Oak, Blackberry Hill trailhead), limiting the number of possible natural features. Therefore, it seems likely that gamers would go to populated sites instead of going to national parks, rural areas, and natural landscapes. Similarly, Walkr and Zombies Run! motivated users to spend time outdoors, though the apps did not specifically encourage exploration of places rich with nature. Users could select any outdoor place that they found suitable or desirable for the activity of running or walking--or they could walk indoors in shopping malls or grocery stores. Designing mobile exergames that can recommend users certain locations such as green areas, parks, and trails can motivate users to spend more time in nature, subsequently encouraging them to connect with nature and engage more with the outdoors.

Rewards for Connecting with Nature. Mobile exergames tend to encourage users to do more exercise while having fun. Since some kinds of exercise such as walking, running, hiking, etc., are included as common outdoor activities, mobile exergames that target these exercises have a strong potential to encourage users to engage more with the outdoors. Accordingly, putting features that can draw the users' attention to nature can be beneficial. For instance, reminding users to look around and appreciate nature and rewarding them for actions like taking a photo featuring nature through gameplay missions can encourage users to have more interaction with nature. Drawing users' attention to nature can also distract them from their fatigue caused by exercise.

The mobile exergame users need to pick up special items (e.g., PokéStops in Pokémon Go, supplies in Zombies Run! and Walkr) to move forward in the gameplay; however, the apps do not mind in which places and how the users collect these items. Designing exergames that provide special rewards to the users, who collect items in natural landscapes, greenways, etc., can offer indirect incentives to them to connect with nature and engage more with the outdoors. Our findings also indicate participants' interest in getting extra bonus points or gathering particular items while exploring, walking, and running in nature to make progress in the gameplay.

Consider Outdoor Safety. All of the mentioned applications (Walkr, Zombies Run!, and Pokémon Go) provided opportunities for users to go outside without paying attention to the users' health conditions and diseases. Also, our findings revealed that Walkr and 'Zombies, Run!' applications did not consider users' present situations, and it may put the users in danger. For instance, one of the participants mentioned that she got immersed in the story of the 'Zombies, Run!' app, and it distracted her from her surroundings. Subsequently, she did not listen or realize that there was a deer around her. She saw the deer suddenly in front of her, and she got scared. Likewise, the Walkr app cannot detect how fast users are walking, and it may expose them to dangers in the outdoors, as they should interact with the app if they want to move forward in the game. Pokémon Go app is more sensitive to the speed of users during playing and restricts them to catch items by showing an error message, though it does not communicate properly with users. Outdoor safety is a real concern in outdoor technologies [22, 23, 25], as being careless may impose serious problems to users. Designing exergames needs to consider safety recommendations to help users be conscious of the surroundings especially when these apps can be used in the outdoors.

5. Conclusion

This paper reports preliminary findings from a focus group and brainstorming session, identifying shared perspectives on how three mobile exergames--Walkr, Zombies Run!, and Pokémon Go--encourage users to connect with nature and engage with the outdoors. While the exergames included motivation to go outside and spend time in the outdoors, they did not explicitly direct them to engage with nature; indeed, they often discourage or distract users from positive engagement with nature. We identify possible design considerations that should be explored when designing or choosing an exergame, setting the stage for further research to investigate using exergames to promote a greater engagement with nature.

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