

Playful (inter)action: six interactive designs to motivate teenagers

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ABSTRACT

In this article, we describe six interventions that invite and motivate teenagers to reduce sedentary behavior through social and physical play. These interventions have been designed for, and evaluated in high school contexts, and use interactive and mobile technology. Four interventions connect with existing behaviors in schools, such as hanging around in the playground, walking through a corridor, doing math and gymnastics. These interventions seduce teenagers to start playing in a physical active way. Two additional, overarching concepts connect the four other installations, and provide personal and group-level feedback using gaming principles. All six interventions together create a basis for a culture of a physically active school context.

At the IDC 2014 conference, a demonstration of the Walk of Fame and the Trampoline Game will be given, accompanied by a showreel of the other four interventions.

Categories and Subject Descriptors

H.5.2 [User Interfaces]: Interaction styles (e.g., commands, menus, forms, direct manipulation), User-centered design.

General Terms

Design, Human Factors.

Keywords

Playful interactions; interactive installations; mobile games; teenagers; public play; design research; in situ evaluation.

1. INTRODUCTION

In the PlayFit project [1], we design for teenagers and high school contexts. Our goal is to motivate physical and social active play [2]; we try to lower the amount of sedentary behavior, while providing an enjoyable, creative and social active school context at the same time [6]. We have published our thoughts and developments on this topic extensively, both in and outside the IDC community [e.g. 3, 4 and 5].

In this article, we present an overview of six interventions that we have designed; interventions that use gaming principles, mobile

and interactive technology to invite teenagers to start playing in a physical and social active way. We have developed and evaluated these interventions for teenagers in a high school context, especially focusing on connecting to teenagers' daily interests, activities and lifestyle.

In this article, we present an overview of the six designs, and the in situ evaluations that we performed. At the IDC 2014 conference, a demonstration of the Walk of Fame and the Trampoline Game will be given, accompanied by a showreel of the other four interventions.

2. Six designs for social and physical play

In this section, we present the six interventions that we have developed for and evaluated with teenagers at high schools.

2.1 Mobile Math Class

Mobile Math Class is a mobile game, which complements the normal math class. Teenagers install this game on their mobile phone, and the class goes outside to perform an outdoor math lesson. Teenagers have to walk around to solve equations in a puzzle game.

Scenario: Sandra and Lily are happy: instead of another boring hour inside the school, they can go outside to enjoy the nice weather. They start the game on their phones, and see an avatar and several numbered blocks. They walk around the schoolyard, and see that the digital avatar is moving in the same direction. Soon, they discover that they have to find and move the correct blocks, in order to solve the equation and the puzzle.

Mobile Math Class has been evaluated with several groups of teenagers and teachers; results were promising, especially the activity of going outside to do math, and the training of math in a game context. In addition, the multiplayer function evoked social interaction, cooperation and emergent gameplay. Main point for improvement was the limited amount of complexity available in this first version.

IDC 2014

June 17-20 2014

Aarhus, Denmark

www.idc2014.org

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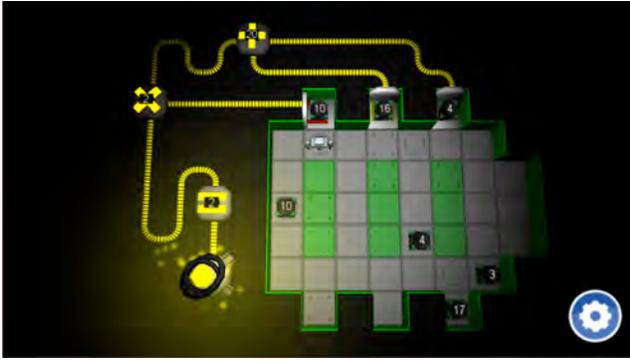


Fig. 1: The gameplay area of Mobile Math Class, as seen on the user's telephone. Players have to solve the puzzle by walking around and collecting the numbered blocks.

2.2 Trampoline Game

A trampoline is used as controller for a game: jumping and jogging on the trampoline is required to win a fast-paced platform game. In this installation, up to four players can compete against each other, for example during a P.E. class.

Scenario: Karin and John are exhausted, just having finished a game on the trampoline. John has won, but barely: Karin managed to make some excellent jumps in the last seconds of the game. The trampoline game they played is a platform game, where you control the avatar by jumping on the trampoline. To win, you have to jump and jog for several minutes, which requires a lot of physical activity.

The trampoline game has been evaluated at several events, and at a high school during P.E. class. Teenagers enjoy the game and the activity, being able to compete and play as intense as they want. Teachers commented that the game could be a nice addition to the regular P.E. activities.



Fig. 2: Teenager playing on the Trampoline Game. Jumping and jogging on the trampoline controls the character in a fast-paced platform game.

2.3 Walk of Fame

The Walk of Fame is an interactive installation in the corridor of a school. Teenagers that walk over a red carpet are recorded, and projected on the wall - but their recording is mixed with those of previous passers-by. The head of a person is connected to the middle body of someone else, and the legs of yet another person. Players can make enjoyable compositions by walking over the red carpet again.

Scenario: James and Susan approach the corridor with the Walk of Fame, and see that two classmates are walking in a funny way over a red carpet. They watch for a minute, realizing that you can record yourself by walking over the carpet. James decides to try it, and runs over the carpet; Susan follows, adding her upper body to James' running legs. After having created several compositions, James and Susan walk on to their class.

We have evaluated the installation on several events, and in a four-week user evaluation at a high school. In total, thousands of users have played with the installation, creating hilarious compositions while running back and forth over a carpet. Continuous interaction with the installation resulted in more complex compositions created in a process of social interaction.



Fig. 3: the Walk of Fame installation. Players that walk over the red carpet are recorded, and projected on the wall. Their upper body is connected to the lower body of previous passers-by, resulting in hilarious combinations.

2.4 Wiggle the Eye

Wiggle the Eye is an interactive installation at a schoolyard, with five wiggle-benches and a streetlight. By sitting and wiggling occasionally, players can influence the behavior of the light, and let each other's benches vibrate. The system's behavior changes on a daily base; social and physical play is required to discover how one can influence the Eye.

Scenario: The schoolyard of a high school: five new benches, and a streetlight with a mysterious globe. During lunch break, hesitant teenagers take place on the benches, and discover that they can wiggle and balance with their peers. The globe contains a moving lamp: when it is shining towards a bench, the bench suddenly starts to vibrate - to the hilarity of the teens.

Wiggle the Eye has been evaluated at two high schools, in two four-week periods. Teenagers played in a physical and social active way, wiggling and standing on the benches during their breaks. More details can be found in [7], which will be presented at this year's IDC conference.



Fig. 4: Wiggle the Eye. Interactive wiggle benches and a street light, that respond to user's actions with vibration and light feedback. The system is controlled by wiggling together.

2.5 Motiv8

Motiv8 is a mobile game that connects to the previous described interventions. Activity on one of these installations, such as Wiggle the Eye, generates resources for Motiv8: a space exploration game that continues day and night. Players can make tiny adjustments using their saved resources, and plan their spaceship's course for the upcoming hours or even a day. This overarching game connects the other concepts, providing a game that creates yet another motivation to play with these installations.

Scenario: Juan is the best of his class in Motiv8: his spaceship has discovered most of the universe. Now, he has a problem though: in two days, his ship will fly into a meteor, and he does not have enough fuel to evade it. Luckily, he can earn new fuel to adjust his course by playing on the trampoline game: in his P.E. class, he makes sure he is the first in, so he can start jumping before the others arrive.

Motiv8 is still being developed, and has not yet been evaluated with teenagers; however, we did execute expert reviews with teachers, and a heuristic evaluation from a psychology perspective.



Fig. 5: Motiv8. Concept sketch of the interface, showing the available resources collected by physical activity.

2.6 Color Fight

Color Fight is a huge LED display, installed at a prominent location in the school. It visualizes the total activity level of the school, compared to another high school in the city. The more the students play on the other four installation, the more colors and

activity is visible on the display. Color Fight tries to combine the activity on the interventions, in a playful and competitive way.

Scenario: Class 3b is tired, but glad: they have been wiggling the entire lunch break, but now their school is clearly ahead of the other school: three-quarters of the huge display is green, in a pulsating wild way. In the morning, they notice to their surprise that the screen is half blue again; then, they remember that the other school had a school party the night before, and clearly they have been making a lot of recordings in the Walk of Fame.

Color Fight has been evaluated in focus groups with teenagers on two different schools. The concept of competing with the other school was successful: teenagers tried to win, and were cooperating and cheering while playing. The visualizations on the display were not yet satisfying enough: teenagers asked for sound output and recognizable images, because the current display was 'too boring after a while'.

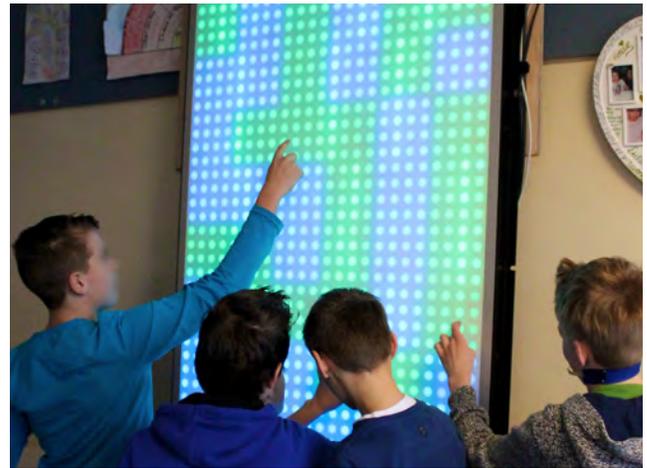


Fig. 6: Color Fight. Group of teenagers discussing the display; green indicates the activity level of their school, as opposed to the blue level of the other school.

3. Conclusions and Future Work

In the design and evaluation of these six concepts, we have gained many insights about this target group and context. With these six interventions, we have created a platform of push and pull strategies for motivating teenagers to become more active. The first four concepts have been evaluated more extensively, resulting in strong insights into motivation through playful interaction. With the overarching concepts Motiv8 and Color Fight, we have started to complete the platform, to take the interactive environment a step further into a full-day activity motivation.

Teenagers and public spaces are a tough combination to design for, because of the huge diversity and practical constraints. At the same time, teenagers are explorative and creative, performing playful actions that we could never have predicted. We are currently analyzing and publishing our insights in this area, so this will be continued!

4. ACKNOWLEDGEMENTS

Mobile Math Class was mostly developed by RANJ Serious Games, NSIB and Fontys ICT; Salko Kattenberg, Jerong Hoyng, Luuk Waarbroek and Fontys ICT students.

Trampoline Game was mostly developed by Embedded Fitness and Fontys; Carla Scholten, Joost Oomen and Fontys ICT students.

Walk of Fame was developed by Fontys ICT and TU/e; first author and Jeroen Hoogers.

Wiggle the Eye was developed by TU/e and Fontys ICT; first author, Linda de Valk and Pepijn Rijnbout.

Motiv8 was developed by RANJ Serious Games, Fontys ICT and 2M Engineering; Michael Bas, Salko Kattenberg, Ferdie Jonkers and Coen Lauwerijssse.

Color Fight was developed by Fontys ICT and Nyoyin; second author, Marvin Janssen and Bart van Goch.

This work would not have been possible without all the students and staff of our universities, but especially of the schools participating in the PlayFit project: Kandinsky, Mondial and Rooipannen colleges. We also thank all our colleagues, both within and outside the PlayFit project, for their support and inspiration.

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