

CHASE AND CATCH – SIMPLE AS THAT!

EFFECTS OF CO-PLAYER VISUALIZATION IN A LOCATION-BASED GAME

1. The FoxHunt Game

Affordable location-aware smart-phones have made it possible to design, develop and deploy mobile games, using the players' positions to combine real world experience with representation of virtual artifacts. Many of these games originate from traditional computer gaming. Some are direct adaptations of existing concepts, such as *PacMan*, others are heavily influenced by them, as in the case of *Botfighters*. Another category of mobile games is inspired by board games, translating the boards to urban spaces and playgrounds, as in *Mobile Monopoly*.

Spikol et. al., have, among others, investigated gaming as a means to engage youngsters in physical activities (exergames). Their work differs from mainstream mobile games; they augment an existing real life concept (orienteering) with the help of digital artifacts (mobile phones), rather than using the real world as an add-on to the computer game. *CatchBob!* is another example of a similar design. This game builds on the simple *Chase-and-Catch* concept, but adds complex elements from console gaming.

In our *Foxhunt* game, the players chase virtual foxes on an outdoor playground. The bridge between physical and virtual space is a GPS-enabled mobile phone where foxes, hunters, and a background map are displayed. To catch a fox, the hunter has to physically move to its location. When close enough, the fox gets caught; the phone vibrates frantically, a fox-scream is played, and a red circle marks the catch.



Hunting virtual foxes

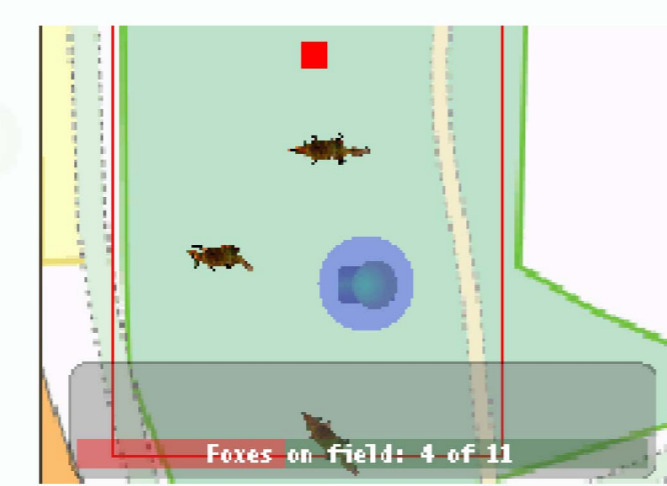
FoxHunt:

A simple *Chase-And-Catch* game with GPS-enabled mobile phones, designed as a modest augmentation of traditional playground games like *Capture the flag*, *Tag*, and *Kick the can*.

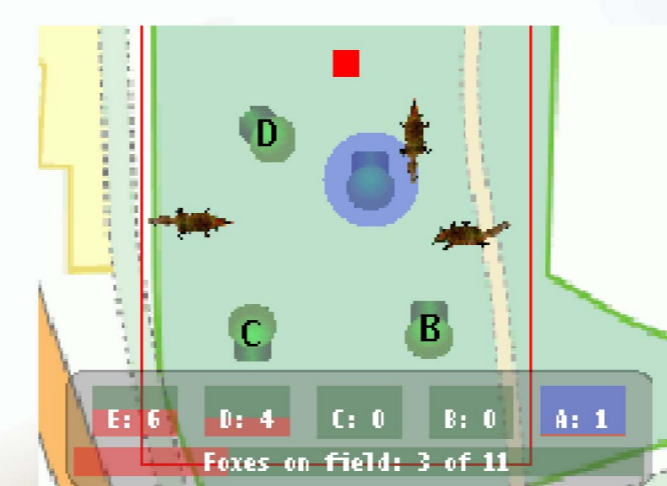
2. Experiment

The 220 participants in the field tests were recruited from 130 high school students (age 16-17), one 4th grade class (around 10 yrs), two 5th grade classes, and one 8th grade class. Each game was played by four or five hunters, lasting four minutes, on a field approximately 100 by 200 meters. The experiments were carried out on several separate occasions under varying conditions; from sunny summer, wet and cloudy autumn, to cold winter and 30cm snow.

Our main focus in these field tests was to investigate how additional display information about the other hunters affected performance, player interaction, and level of fun. Hence, half of the players where using a display where only their own avatar (in addition to the foxes) where present on the map. The rest used a version where all players were rendered, including their ID, and with player scores in separates bars at the bottom of the display.



Stripped interface:
Player avatar in blue



Rich interface:
Co-player avatars in green,
scorebars at bottom

Most of the games were video taped, and we secured observations both from the field and from conversations between other players watching the game. In addition, log files from the server provided more detailed information about each game.

Two questionnaires were filled out. In the pre-game form, the hunters stated their gender and inclination for physical exercise. After each game, they completed a second form where they rated how much fun the game was, their own effort, whether they were in competition with other players, whether they cooperated with other players, and if they looked at other players in the field. Those playing the game with extra visualization were also asked if they looked at the other hunters on the screen.

Research question:

Does visualization of co-players' positions and their scores affect:

- Performance?
- Interaction?
- Enjoyment?

3. More is not more

It was expected that the players who could see the other hunters represented on the screen would benefit from this extra information, and develop more efficient strategies for catching foxes. However, the results show that additional display information had no significant impact on their performance. They did not catch more foxes, and they did not run more than the players without this information. Analysis of field observations reveals no major differences in behavior between the two groups.

An explanation might be that information about other players is not needed in order to play the game. You can catch foxes without cooperating with other players. The display is just an aid to view what is hidden in the physical world. The participants are playing for fun, and they do not need to develop smart strategies for accomplishing that. As the hunters run around on the field they show little interest in the other players. Although they share the same goal of catching as many foxes as possible, there is little competition amongst the players. In a certain aspect, *FoxHunt* is a solitary game, hunters play alone, but still, they do it in good company. In particular, when playing without co-player information, the player (that is, the position on the map and the score) is anonymous, but still physically present.



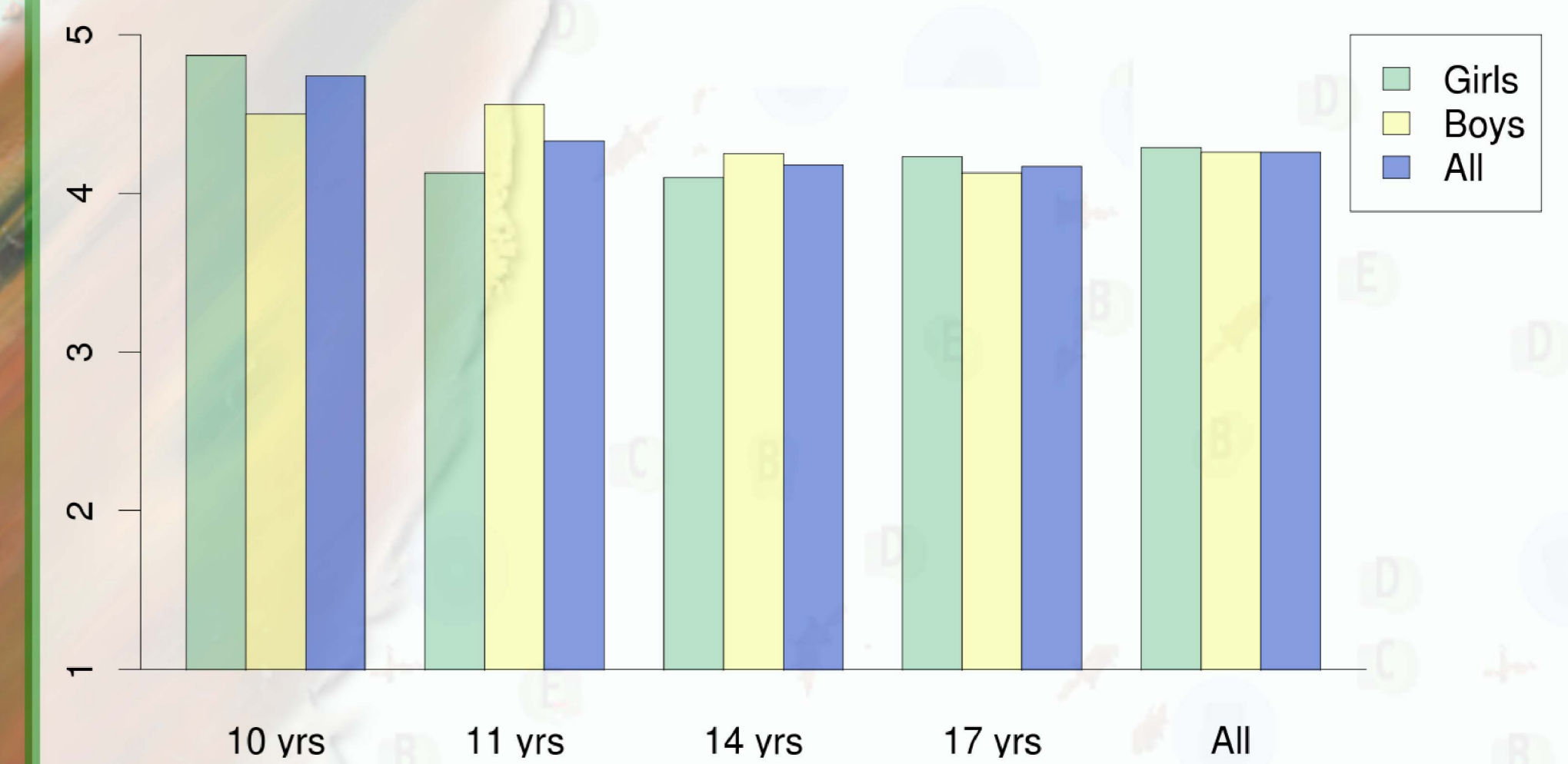
Hunting alone, playing together

Finding 1:

Visual information about co-players' positions and scores *does not* improve performance, nor do it increase player interaction.

4. Player enjoyment

The level of reported fun is indeed high, with an average of 4.3 on a scale from one to five. The younger age groups report a slightly higher enjoyment. However, girls seem to enjoy the game as much as the boys, or, as in the youngest group, even more.



Fun level (y-axis, highest value is 5) distributed on age groups and gender

The reported fun-level does not correlate with preferences for sports or physical exercise. However, there is a statistically significant, albeit weak, correlation with visualization of other hunters. For instance, on one day, the average in the group without visualization was 3.8, whereas those with visualization reported an average of 4.5.

The game obviously appeals to users of all ages, and both genders, with diverse physical interests and abilities. This is consistent with field observations and feedback from teachers accompanying the students.

The authors firmly believe that simple Chase-and-Catch games, like *FoxHunt*, have substantial potential to be used in physical education and sports, as a fun-enhancing tool.

Finding 2:

FoxHunt is fun, for everyone, independent of gender, age, and fitness. Moreover, additional co-player information seems to slightly increase the fun-level.

