

Formative Evaluation of Smartwatch Exergaming

Nicola Marsden¹, Thomas Wollmann², Britta Lohmann², Gerrit Meixner²

H-Infam Heilbronn Institute for Applied Market Research, Heilbronn University¹
UniTyLab, Heilbronn University²

Abstract

Exergaming for adolescents is a promising field of design. Going beyond console-based exergames, smartwatches can utilize the pervasive nature afforded by modern ubiquitous devices and use physical body movement and changes of location as the basis for gameplay. In a formative study of PokéWatch, a mobile location-aware exergame based on the game Pokémon we explore how this approach can be used with adolescent children.

1 Designing for Adolescents' Physical Activity

Gamification has been used in many areas to enhance activities that are not immanently motivating. One application is exergaming, i.e. using game mechanics to increase physical activity. Reviews of studies on physical activity from exergames have shown positive outcomes (Dunwell, Torrens, Clarke, & Doukianou, 2014) but also raised concerns about whether the results are ecologically valid, i.e. whether the physical activity shown in the laboratory would translate into exergames resulting in heightened physical activity under natural circumstances. Incorporation of innovations in games in general, of research on gamification, and new technology (e.g. sensors, location-based service) could further enhance the potential of exergames to increase physical activity regarding ecological validity (Baranowski, 2015). Smartwatches as a new development with a major focus on physical activity from the beginning offer novel ways to facilitate physical activity.

Adolescents typically go through a dramatic downturn in physical activity around the age of twelve years. But only few exergames are explicitly taking the specific needs and demands of this age group into consideration (Macvean & Robertson, 2012) although adolescents are a prime target of physical activity interventions. With adolescents' high propensity to accept new technology – coupled with behavioral changes and the need for orientation and encouragement, this developmental phase enables research of novel interaction possibilities with real world impact (Fitton & Bell, 2014). In order to develop effective systems that are based

on the newest technology and research on gamification, and are adapted to the adolescent users, a formative approach of research is needed.

2 Exploratory Study of Location-Aware Exergame

Generally, formative evaluation is still an undervalued part of exergame development (DeSmet et al., 2015). Formative aspects are even more relevant when exploring the use of a new technology, and the use of smartwatches to enhance physical activity through gamification is an important challenge in this nascent field of study. To study the potential of the pervasive nature afforded by modern ubiquitous devices for exergaming, we are planning a field study to understand how a mobile location-aware exergame can efficiently be used with adolescent children.

We will evaluate PokéWatch, a mobile location-aware exergame we are designing for adolescent children. While up to now, exergames for youth have typically been indoor activities, this design takes a new approach: Using location-based information, it motivates adolescents to move around outside. Based on the widely played game Pokémon it encourages physical activity based on the game's narrative and uses body movement as the basis for gameplay. With the smartwatch connected to the smartphone and using its GPS to detect players' activities, the interactions with the Pokémons are converted into actions within the game, e.g. meeting a "water type Pokémon" is only possible close to bodies of water in the physical world. The exploratory research study will investigate adolescents' motivation and adoption of PokéWatch. Using a mixed methods approach we will leverage log data analysis of the smartwatch and interview methods to investigate acceptability of the exergame, thus facilitating implementation and sustainability while gaining further insight in designing UX for health applications.

References

- Baranowski, Tom. (2015). Are active video games useful to combat obesity? *The American journal of clinical nutrition*, 101, 1107-1108.
- DeSmet, Ann, Palmeira, António, Beltran, Alicia, Brand, Leah, Fernandes Davies, Vanessa, & Thompson, Debbe. (2015). The Yin and Yang of Formative Research in Designing Serious (Exer-) games. *Games for Health Journal*.
- Dunwell, Ian, Torrens, Kate, Clarke, Samantha, & Doukianou, Stella. (2014). Game-based lifestyle interventions for adolescents: An evidence-based approach. Paper presented at the Interactive Mobile Communication Technologies and Learning (IMCL).
- Fitton, Daniel, & Bell, Beth. (2014). Working with Teenagers within HCI Research: Understanding Teen-Computer Interaction. *Proceedings of the 28th International BCS Human Computer Interaction Conference on HCI 2014-Sand, Sea and Sky-Holiday HCI*.
- Macvean, Andrew, & Robertson, Judy. (2012). iFitQuest: a school based study of a mobile location-aware exergame for adolescents. *Proceedings of the 14th international conference on Human-computer interaction with mobile devices and services*.