

# Promoting of Environmental Education via Outdoor Activities in Finland: Clean Games case

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**Abstract** - Digital tools supporting learning outside the classroom have attracted the interest of educators, researchers, and companies developing learning applications. This material demonstrates the application of mobile technology for engagement and encouragement of various target groups in development of environmental awareness. Students, families, environmental activists, and authorities voluntarily participated in a pilot of mobile application using mobile telephones to collect litter from the city streets in a competitive and entertaining way.

**Keywords:** digitalization, environmental education, citizen engagement, mobile learning, environmental awareness

## 1. Introduction

Over last 10 years, availability of smartphones for a wide range of people led to the technology boom in smartphone applications (apps) design, which is one of the fastest-growing tech industries.

Recent statistic shows that Finnish children spent up to two hours daily “glued” to screens [1] and 70-80% of children aged 7-17 years access the internet via their smartphones or tablets. The content of apps should not necessarily be purely for entertainment, but may include a pedagogical component, e.g. apps for fluent math or language learning. Even better if the app could promote outdoor activities, for instance, iNaturalist [2]. Moreover, the apps may create new opportunities in environmental education and environmental awareness raising. Thus, they can benefit not only teachers, parents, and children, but also researchers and the entire community.

In this work, we evaluate the mobile app CleanGames to identify the advantages of using this mobile app in environmental education, and present results of piloting of CleanGames app for the first time in Finland.

## 2. Method

### 2.1. Participants

There were three target groups, each per one pilot level.

The target group 1 consisted of 12 people represented by employees of local waste management actors (Kainuu Waste Management Operator Ekokymppi and the Recycling Center Entrinki), and higher education organisation (Kajaani University of Applied Sciences). The average age was 46 years, and the group was composed of 72% females and 18% males. The target group 2 consisted of 340 students of middle and vocational schools living in Kajaani, Kainuu region, Finland (Fig.1). The average age was 14 years, ranging from 10 to 17, and the group was composed of 42% females and 58% males.

The target group 3 consisted of 45 citizens primary families with children living in Kajaani. The average age for children was 8 years (ranging from 4 to 12) and for adults was 36 (ranging from 24 to 42), and the group was composed of 61% females and 39% males.

The team of volunteers supported the organisation and registration of the participants on the piloting site (Fig.2). For the third piloting, entertaining activities on the pilot site were organised to encourage citizens with children to participate in the event.

## 2.2. Instrument

Participants in target groups 1 and teachers, supervising target group 2, completed a pre- and a postpiloting surveys. The survey consisted of 11 questions, adopted from [3] and open-writing questionnaire.

## 3. Results and Discussion

**Use of mobile app to support Environmental Education and Awareness.** New digital tools provide a versatile learning environment. A mobile app may encourage learning and support people who differ in their learning preferences and abilities. Using a mobile app as learning environment for waste management practices increased environmental awareness of the students. A survey of the participants on a pilot site before the game start showed that the students did not expect to collect any litter from the city streets. The answers of the students after the game clearly indicated that they were concerned about the amount of waste collected during the competition (Fig. 3). As a result of a one-hour game 670 kg of mixed waste was collected in the city area.

Finnish teachers are recommended to use various learning environments for teaching [4]. The teachers and staff of the City Administration who participated in the events, were asked to complete pre- and post-piloting surveys with the following questions:

1. The concept is an effective learning aid or assistant for students/ residents with regard to environmental issues
2. The concept is easy to use for raising environmental awareness
3. The concept makes it easier to discuss environmental issues among teachers/experts
4. The concept makes it easier to discuss environmental issues with students/ residents
5. The concept can be used as a supplemental tool for existing courses/ improving environmental situation
6. The concept allows you to productively promote Outdoor Exercise Activities and raise awareness of the environment
7. The concept is a convenient platform to launch discussions about environmental issues
8. The concept has the potential to become a good learning tool with regard to environmental issues/ independently from residents' background
9. The concept can instantly raise awareness and visibility of environmental issues regardless of your location.
10. The concept is useful as a supplement tool for improving environmental situation.
11. Overall, satisfaction with the concept with regard to environmental issues is acceptable.

The respondents were asked to express their opinions on a scale from 1 to 10, where 1 was “totally disagree” and 10 was “totally agree”. Generally, for questions 1-10, the average score increased by 1-1.5 points. The minimal points at initial and post-piloting estimation get question 3 “The concept makes it easier to discuss environmental issues among teachers/experts”. The respondents could not recognise the potential to use the tool to raise environmental issues among colleagues.

Feedback received from citizens and families was rather positive, although broader advertisement campaign for involvement of citizens could be implemented in the future.



Fig. 1: The piloting of the CleanGames with students of middle and vocational schools.



Fig. 2: The volunteer team on the piloting of the CleanGames with students of middle and vocational schools.





Fig. 3: The amount of waste collected during the piloting with students of middle and vocational schools.



Fig. 4: The piloting of the CleanGames with families and citizens of Kajaani.

## 4. Conclusion

Digital tools have a potential to engage general population, especially children, and to develop positive attitudes towards resolving environment issues. The use of mobile technology could benefit people irrespectively of their genders, physical abilities, or social status. The concept could promote involvement of students both inside and outside the classroom by providing cognitive and emotional learning. Parents and teachers found the proposed outdoor activity supplemented with technology-based approach to be effective and innovative. Participants emphasized that sustainable practices learned in this way may have long-term retention and improve understanding of the environmental concerns.

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