20 GAMIFICATION TO IMPROVE ADHERENCE IN HOME-BASED ACTIVITIES FOR SENIORS

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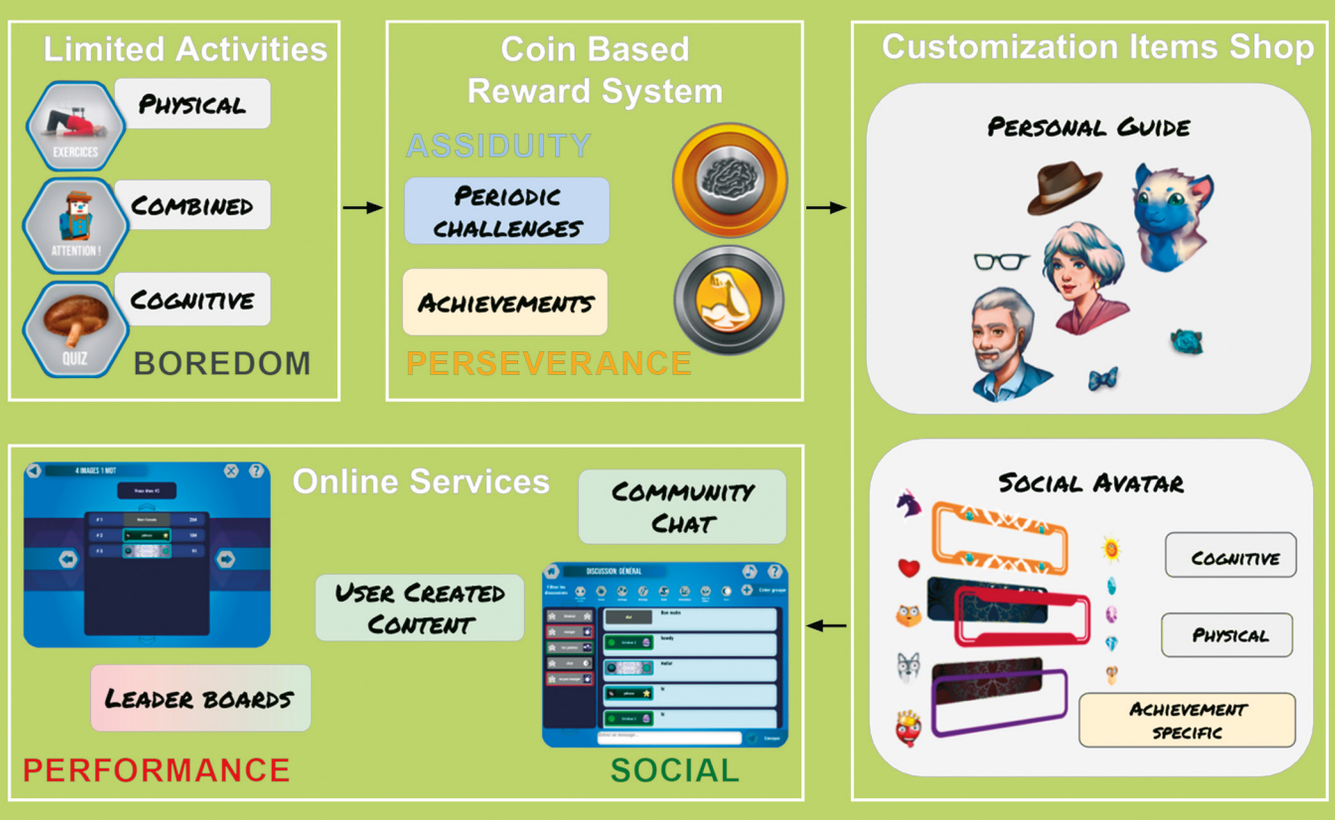
ABSTRACT

In the context of the "Stay Fit Longer" European project, aiming at developing a tablet application with gamified activities that prevents cognitive and physical decline in seniors, we implemented different gamification strategies for studying adherence in the elderly population. Using proven mechanism from the mobile entertainment industry, such as daily activities, leader boards, achievements, temporal limitation and reward system for customization of social avatars, we are measuring the usage and performance of 120 subjects in Belgium, Switzerland and Canada during the next 18 months. We expect that one of the greatest motivation factors comes from intrinsic rewards of their social environment by being congratulated by their relative for their dedication and performances.

KEYWORDS

Healthy aging; Serious games; Casual games; Rewards; Motivation; Isolation; Self-management; Adherence; Home training.



CONTEXT

According to the World Health Organisation (WHO), the world's population over 60 years old will nearly double between 2015 and 2050. Consequently, a growing number of people will be affected by neurodegenerative diseases, such as Alzheimer's.

Some retirees become less active and have less social contacts. The best available strategy for healthy ageing is early prevention to delay the age-related symptom onset of physical and cognitive decline. Several studies (Litwin 2018, de Rezende 2014) show that the risk factors for faster cognitive decline include: sedentarization or lack of physical activity, lack of cognitive stimulation, and social isolation. Knowing these risks, it is thus important for seniors to stay active after retirement.

One of the main strategies to increase adherence is gamification as studies have shown that it has been successfully used on younger audiences (Amari 2014). However, we do not know yet which gamification strategies work on an older population.

In this paper we present the developed solution within the project frame "StayFitLonger", supported by the European program Active Assisted Living. "StayFitLonger" aims to develop a tablet application with gamified activities that prevents cognitive and physical decline in seniors and allows optimal ageing and long-term independence at home.

TARGETED ISSUES

The activities proposed by the application have been specifically designed by medical experts to reach therapeutic goals for the targeted elderly population. The training program is composed of various physical and cognitive activities, while also allowing social interactions between users. Gamification strategies have been added to increase user adherence to the overall application during a 12-month period.

The aim is to encourage users to follow the clinician-recommended dose for each activity, without overworking themselves especially in physical activities. Since people of this given age bracket (60+ years) are extremely heterogeneous in abilities and interests, it is necessary to let them self-manage their training by allowing them to set their own goals, choose exercises of their interest and motivate them in that direction. As the target population is the least likely to use spontaneously technology to ease everyday life, it is thus essential to provide an application, developed specifically with this population in mind, that gives a good user experience.

The long-term use intended for the application is another particularity of our case as it will be used in a clinical study for its validation and will last 12 months.

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PROPOSED SOLUTION

We have implemented several gamification elements in the application: first, by using extrinsic rewards in the form of resources or coins: users can unlock content, which is a strategy commonly used in casual gaming. Two dedicated types of coins have been implemented to promote both physical and cognitive activities.

In gaming applications, the implementation of daily quests, achievements, and limitation strategies invites the user to come back frequently. As users can choose freely what activity they want to perform, coins are given when they follow the recommended dose set through periodic challenges. The limitation system prevents the user from performing the same activity too many times to avoid physical fatigue and running out of cognitive content too quickly. Rewarding long-term adherence is done through leveled achievements.

As the application will be available to a potentially frail population, we have only chosen extrinsic reward commitment. Performance scores are also presented as public leaderboards for the different activities.

To test the efficiency of extrinsic rewards, the overall cost and gains have been adjusted to be accomplished in six months of use. Also, users can choose to spend coins to customize their personal guide's appearance and their username display in social rooms (chat system).

RELEVANT INNOVATION

This project main innovation is the implementation of traditional gamification strategies from the casual mobile world to a wellness application dedicated to the elderly. The implementation of both extrinsic and intrinsic rewards has balanced both the therapeutic constraint support as well as the maximization of the user adherence to the application.

By customizing their username decorations (borders, backgrounds, and icons), users can display expensive items or some that can only be obtained through high-level achievement to show their commitment to the program.

As part of the cognitive exercises, users can create new content quizzes and image concepts that can be shared with others. For this purpose, we have developed a moderation system and a liking vote mechanism for users to rate peer-created content.

PROJECT OUTCOMES & RESULTS

A closed beta version has been released among a group of 128 people recruited in 3 different countries (Switzerland, Belgium and Canada), participating in a randomized clinical trial whose therapy adherence will be assessed during 12 months. The long-term therapy adherence assessment, which measures the training amount and regularity, is the main interest of the "StayFitLonger" project.

It measures the participants' progression in the different challenges, achievements and gives their performance score in each of the different physical and cognitive activities. These results can later be correlated to the clinical study outcomes. The participants are also asked about their gaming and technological habits in order to study the different gamification tool acceptance in gamers vs. non-gamers. Since gamification for seniors still hides many unknowns, this study will give some insights about the efficiency and reception of standard motivational tools used in casual mobile games in the senior population. It is possible that some strategies fail to work with certain people, while others might prove very efficient in increasing motivation. The goal is to be able to find a motivational tool that is appropriate for the largest portion and not only for the very competitive and performance-driven individuals, who would already perform well on mainstream apps.

CONCLUSION

This technical paper presents different gamification strategies and approaches implemented in a tablet application that provides cognitive and physical activities for seniors. The planned randomized clinical trial will provide general trends of the different gamification strategies effects on senior adherence to the exercises. This implementation goal is rather to study the elderly behavior and their relative interest in different gamification approaches than build a formal experimental plan or, on the opposite, develop the most efficient reward mechanism.

We expect that one of the greatest motivation factors comes from intrinsic rewards of their social environment by being congratulated by their relatives for their dedication and performance. Future developments should aim at better integrating the developed activities in the elderly daily life routine and directly bridging with the existing social networks used by their peers and relatives.

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