The SToP project app: promoting the creation of habits through explicit learning and self-monitoring

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Abstract

The explicit goal that the SToP App was to achieve the creation of positive habits which can help prevent and fight the obesity problem. Two main psychological processes are used in order to reach this goal: explicit learning and self-monitoring. In this study, it is described how the SToP App achieves these two objectives through a design and implementation consistent with the psychological processes involved in self-regulation processes. In this sense, the App designed within the SToP (Stop Obesity Platform) project represents an example of integration between technology and psychology.

Keywords
SToP Project, self-regulation, health-behaviour, gamification

1. Introduction

STOP is a multidisciplinary project funded by the European Community in order to support the fight to obesity through the utilization of smart technologies. The SToP app, which will be freely available for Android and IOS smartphones, is one of the main components which will be the outcome of the project. The consortium of academic and private organization is working to the definition of "an everyday life tool" which can be used by the stakeholders to improve their health condition and avoid obesity.

Obesity is a medical condition, related to several serious health issues: heart diseases, arthritis, liver disease, cancer, diabetes, etc. For this reason, it is considered a major public health problem, affecting most of western countries [1]. European Citizens could benefit from a technological support to their daily management of self-nutrition.

The SToP App, using gamification for helping individual to get information related to the nutrition-management process and the constant everyday checking of information will help individuals to set self-tailored nutrition goals which will support their health and physical well-being.

This technology will be used in order to reach educational goals related to the field of nutrition: the monitoring of health parameters like personal weight and BMI (body mass index, calculated for the assessment of obesity). It will involve the use of a "serious game approach"[2], namely the use of entertainment strategies aimed at educating individuals towards important life processes.

The SToP App contains three major functions which can support the user to take care of his physical health, coherently embedded in a gamified environment:

- The everyday monitoring of personal parameters related to weight and body shape
- The information providing related to the nutritional properties of food
- Feedback related to the everyday nutrition process, set as "nutrition daily goals"

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2. Stimulating habits creation

Human habits have the power to predict human behavior, regardless of explicit intentions [3]. Therefore, the creation of habits is a strong goal that organization should undertake in order to increase the likelihood of health-related behaviors for individuals. When behaviors have been performed repeatedly in the past, individuals can benefit from a lower effort to re-produce it. Finding also report that explicit intentions to produce a certain behavior are strengthened by the creation of habits in physical related behaviors [4].

However, the nutrition process presents complex aspects which individuals must explicitly take into account when planning food-related behavior.

Food-related knowledge is a generic construct, which is conceived as having a main role in the nutritional process. It involves believes and information about the goodness, the healthiness, the usefulness of quality and quantity of food and drink which can be absorbed in everyday life.

Explicit self-monitoring is an essential behavioral part of undertaking healthy diet. Literature found it as having a major role in weight loss intervention programs [5]. According to self-regulation theory [6] the process of changing habits requires strong skills related to self-regulation in order to develop the possibility of acknowledging rewards related to the achievement of goals.

For this reason, the Stop app was designed to fulfill a fundamental function: to promote self-regulation through explicit learning. Let's try to see how these functions are fulfilled and, first, what is meant by self-regulation. "Self-Regulation refers to the self-directive process through which learners transform their mental abilities into task related skills" [7]. This is the process that people can use to manage and organize their thoughts and convert them into skills. Self-regulation is the process of continuously monitoring progress toward a goal, checking outcomes, and redirecting unsuccessful efforts [8].

According to this definition, the stop App has been designed to allow and stimulate the following fundamental functions:
1. F1 monitoring progress toward a goal;
2. F2 checking outcomes;
3. F3 redirecting unsuccessful efforts.

2.1 F1 monitoring progress toward a goal

The process of monitoring one's progress allows people to keep attention focused on the task and promote individual self-efficacy. Being able to identify a goal and regulate one's behavior according to the achievement of the set goal is a self-regulation process that gives a sense of direction and meaning to one's actions. In the context of studies on motivation, a privileged role is reserved for the promotion of intrinsic motivation, which allows the individual to maintain behavioral persistence, defects to give continuity to their actions [9]. This behavioral set makes it possible to plan, verify and possibly modify, through feedback and feed-forward processes, one's own behaviors to make them functional to the achievement of the purpose - proceeding towards subsequent objectives becomes, therefore, important for the achievement of the final purpose and represents a process that needs timely monitoring. Based on these assumptions, the App was designed according to a flow of daily goals that the user can achieve and constantly monitor (Figure 1);

Figure 1: Function1 Monitoring goals through SToP App

2.2 F2 checking outcomes

In the process of monitoring one's actions, the moment of verifying their effectiveness is crucial for self-regulation because it allows those adjustments necessary for the progress of one's action. In other words, verifying one's own work not only fulfills a function of verifying the past, but also of projection into the future. It is, therefore, using both feedback (my behaviors have been effective and useful in making me reach the objectives) and feedforward processes (if my behaviors are suitable I can hypothesize that also in the future they will help me to achieve other objectives) that the individual can proceed in his own development [10].

In the App design specific attention was given to the design (in both formal aspects and graphical interface) to the visualization of the outcomes and feedback connected to them.

Therefore, app presents a series of panels that change continuously according to the information entered by the user. The pictures change in a *flourishing* way when the user has reached the daily goals, and in a *languishing* way when, on the other hand, the goals are not achieved (Figure 2);
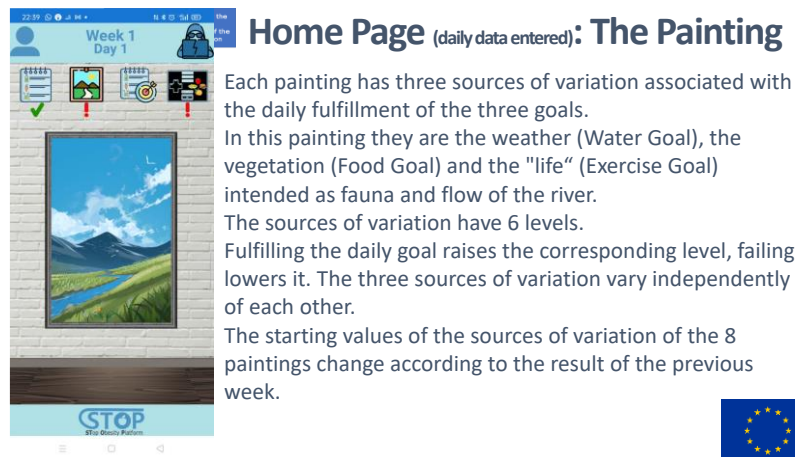

Figure 2: Function2 Checking outcomes through SToP App

2.3   F3 redirecting unsuccessful efforts

The third process involved in self-regulation implies the possibility (and the ability) to modify one's actions to achieve the objectives. In fact, in individual behaviour, the actions put into practice are not always consistent with the resolution of the task and the achievement of objectives. In other words, the

possibility of error and therefore of failure is part of the learning process. In our case, therefore, it is important to offer the game user the opportunity to "correct himself". Actually, the two previous functions allow to reach the final moment of the self-regulation process which allows not only to correct one's own behavior in the future (if it has proved unsuitable in the previous phase), but also to "return to one's own steps", correcting one's learning path from within [11]. Obviously, this is a typical possibility of gamification which, unlike the real world, allows you to easily return to your work to modify your existence according to the achievement of objectives [12].

In our case, the Stop games consist in sorting the presented foods in descending order following a ratio (food property or and nutrient). Each game consists of three levels of increasing difficulty, with each mistake it is necessary to start over (Figure 3).
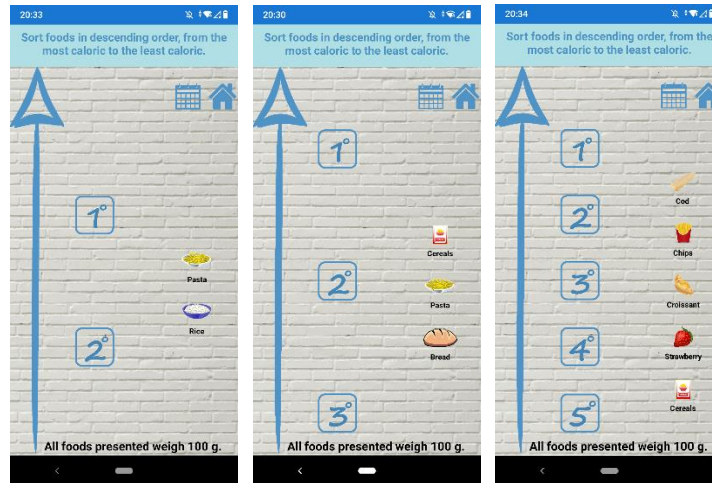
Figure 3: An example of the games in the SToP App

A new game is automatically unlocked every day. Every week the ratio of the game changes: in the first week it will be calories, in the second cholesterol, in the third the sugars, etc. The Game Menu reports games that have been successfully completed; however, it is always possible to play the games unlocked in the previous days or weeks (Figure 4).

Figure 4: Function3 Checking outcomes through SToP App

3. Conclusion

The use of new technologies within projects and courses of training and psycho-social intervention is now a pervasive phenomenon. Gamification, in this area, is currently a rapidly expanding phenomenon. It is therefore important to pay specific attention not only to the technological characteristics of the games implemented, but above all to dwell in a timely and in-depth manner on the design of the App. This attention should be even more focused when gamification aims to change the behavior of individuals, thus feeding on complex psychological dimensions and processes.

Elsewhere, too, the importance of a design approach as the first phase of a gamification that wants to use technology and the advantages associated with its use for psychological purposes has been emphasized [13] [14]. In the case of the development of the SToP App, an application of integration of technology and psychology has been proposed since the design phases and with widespread attention not only in the selection of the contents to be developed in the games, but also in the definition of the entire game process. In this study, a concise description of the application of this model was proposed in accordance with the objectives of the project to promote healthy behaviors. It was therefore illustrated how the App was designed and developed to promote a specific psychological process that underlies the behavioral changes: self-regulation.

The one illustrated in this study represents only one of the possible applications of psychological theoretical frameworks to the design of digital tools, usable in formal and informal training contexts.

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